THE physical therapy REVIEW

Volume 31 - Number 10 October 1951

Amputee Training in Greece—BRUNNSTROM

Fibrositis—MENNELL

An Adjustable Foot Support—HOLTON

Performance of the Finger Flexor Muscles—DARWIN

PUBLISHED MONTHLY BY
THE AMERICAN PHYSICAL THERAPY ASSOCIATION

THE KABAT-KAISER INSTITUTE
At Vallejo, California

Announces

THREE MONTHS' POSTGRADUATE COURSES FOR PHYSICAL THERAPISTS IN TECHNICS OF NEUROMUSCULAR REEDUCATION

Physical therapists must be members of the American Physical Therapy Association, members of the American Registry of Physical Therapists, or qualified foreign physical therapists.

Courses start October 1st, January 1st, April 1st, and July 1st

Number of students accepted is limited. Certificate given upon successful completion of the course.

TUITION: $150

Applicants should communicate with:

Margaret Knott, Chief Physical Therapist
Kabat-Kaiser Institute
Vallejo, California

OFFICIAL INSIGNIA—THE AMERICAN PHYSICAL THERAPY ASSOCIATION

***The* PIN (Actual Size)**

The official pin of the Association is made of 1/10 of 10 karat gold-fill with blue enamel outline. Price,

$4.50

Including Federal tax and mailing charge. (Subject to change without notice.)

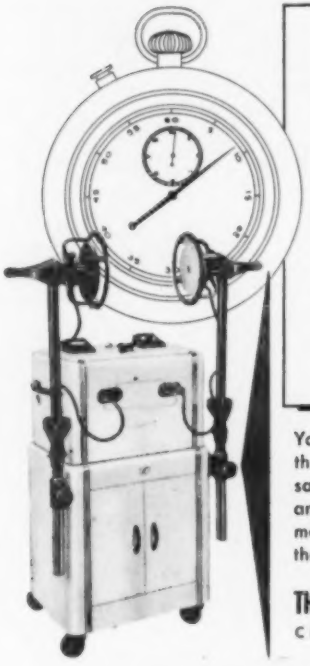
***The* EMBLEM**

(Exactly the same—but four times as large as the pin.)

Distinctive in its colors of gold and royal blue on white cloth. Each

25c

May be secured from
AMERICAN PHYSICAL THERAPY ASSOCIATION
1790 Broadway, Room 1315
New York 19, N. Y.



can YOU make effective diathermy treatment applications in 9 seconds or less?

L-F

You *can* with the Liebel-Flarsheim SW-660 diathermy! The ingeniously designed unit, the versatile applicators and the adjustable counterbalanced arms all contribute to faster set-ups and more efficient treatment. Why not write us for all the facts today!

THE LIEBEL-FLARSHEIM COMPANY
CINCINNATI 2, OHIO

FCC APPROVAL

PTR-1051

Georgia Warm Springs Foundation

GRADUATE COURSE

Physical Therapy and Occupational Therapy in the Care of Poliomyelitis

This course is open to graduates of approved schools in physical therapy and occupational therapy. Such graduates must be members of the American Physical Therapy Association and/or the American Registry of Physical Therapists and Occupational Therapy Association.

Tuition: None. For Scholarship to Cover Transportation and Maintenance, Contact: National Foundation for Infantile Paralysis, 120 Broadway, New York 5, New York.

Entrance Dates: First Monday in January, April, July and October.

Duration of Course: The Course is divided into two parts:

Part I. Over-all care of convalescent polio with particular emphasis and special training in muscle testing and muscle reeducation.

Part II. Particular emphasis and special training in functional testing and functional retraining.

Each Part lasts three months and only selected students who have completed Part I will be admitted to Part II. All students applying for Part I must be willing to remain through Part II if selected.

For Information Write:

Robert L. Bennett, M.D.
Georgia Warm Springs Foundation
Warm Springs, Georgia

EVEREST & JENNINGS
***Folding* WHEEL CHAIRS**
for all ages

Everest & Jennings folding wheel chairs help children of all ages to enjoy outdoor living. Everest & Jennings cooperate with the physical therapist in selecting the chair to help speed rehabilitation of the patient.

Send for free booklet on invalid aids.

EVEREST & JENNINGS
761 No. Highland Ave., Los Angeles 38, California

THE physical therapy REVIEW

THE OFFICIAL MONTHLY PUBLICATION OF THE AMERICAN PHYSICAL THERAPY ASSOCIATION

Features articles by physicians, scientists, educators, and physical therapists relating to treatment procedures, developments in the field, research reports, news of the profession, abstracts of current articles, and reviews of new books relating to physical therapy.

Domestic $6.00 per year
Foreign $6.75 per year

1790 Broadway **New York 19, N. Y.**

TWO-WEEK MULTI-PROFESSIONAL INSTITUTE IN CEREBRAL PALSY

Dates: January 21 - February 1, 1952

Followed by

THREE-MONTH POSTGRADUATE COURSE IN CEREBRAL PALSY

(limited at this time to qualified physicians, physical and occupational therapists)

Dates: February 4 - April 25, 1952

A professional statement of completion will be granted by Columbia University upon satisfactory completion of the three months' course.

Sponsored by
THE COORDINATING COUNCIL FOR CEREBRAL PALSY IN NEW YORK CITY, INC.

In Cooperation with
COLLEGE OF PHYSICIANS & SURGEONS, COLUMBIA UNIVERSITY, AND THE VARIOUS DIAGNOSTIC AND TREATMENT CENTERS OF GREATER NEW YORK

For full information write

Miss Marguerite Abbott, Executive Director
Coordinating Council for Cerebral Palsy
270 Park Avenue, New York 17, New York

THE physical therapy REVIEW

418 Vol. 31, No. 10

published monthly by the
American Physical Therapy Association
at 1790 Broadway, Room 1315
New York 19, N. Y.

Editor: E. JANE CARLIN

Associate Editors: DANIEL R. BARTHOLOMEW, MARY E. CALLAHAN, LOUISE REINECKE

Managing Editor: TITA OBANDO

Business Manager: CAROL VANCE

Membership in the American Physical Therapy Association is $15.00 a year, including a subscription to THE PHYSICAL THERAPY REVIEW. Subscriptions for nonmembers to THE PHYSICAL THERAPY REVIEW, $6.00 a year; $6.75 in Canada and foreign countries. Single copies 75 cents. (50 cents to members.) Reentered as second class matter August 11, 1949, at the post office at New York, N. Y., under the act of August 24, 1912.

The statements in the manuscripts published in THE PHYSICAL THERAPY REVIEW are made solely on the responsibility of the author. The American Physical Therapy Association does not assume any responsibility for statements contained therein. Manuscripts accepted for publication in THE PHYSICAL THERAPY REVIEW are for exclusive publication and may not be published elsewhere without permission.

Officers

President — Mary Clyde Singleton
Vice-president — Harriet S. Lee
Secretary — Marian Williams
Treasurer — Floy Pinkerton
Speaker, House of Delegates — Mary E. Nesbitt

Directors

LOUISE A. BAILEY — Chicago, Ill.
MARGUERITE I. IRVINE — Seattle, Wash.
MARGARET A. KOHLI — Madison, Wis.
SUSAN G. ROEN — Los Angeles, Calif.

Advisory Council

DONALD COVALT, M.D. — New York, N. Y.
EMIL D. W. HAUSER, M.D. — Chicago, Ill.
HUGO V. HULLERMAN, M.D. — New York, N. Y.
CHARLES O. BECHTOL, M.D. — Oakland, Calif.
AURA SEVERINGHAUS, PH.D. — New York, N. Y.

Standing Committees

Education—
FLORENCE S. LINDUFF — Washington, D. C.
Exhibits—
MIRIAM L. RODENBERGER — East St. Louis, Ill.
Interprofessional Relations—
ANNETTA WARDLEY — Denver, Colo.
Nominations—JESSIE STEVENSON, Nashville, Tenn.
Program—MARIAN WILLIAMS, Palo Alto, Calif.
Publication—E. JANE CARLIN — Jenkintown, Pa.
Public Laws—FLOY PINKERTON, New York, N. Y.
Public Relations—
DOROTHY E. VOSS — Washington, D. C.

National Office Staff

Executive Director — Mildred Elson
Assistant Executive Director — Mary E. Haskell
Educational Consultant — Margaret Moore
Poliomyelitis Consultants
Lucy Blair, Ruth Whittemore

Table of Contents:

Amputee Training in Greece—Signe Brunnstrom 419

Fibrositis—James Mennell, M.A., M.D., B.C. (Cantab.) 427

An Adjustable Foot Support—Mabel E. Holton 431

Performance of the Finger Flexor Muscles —Natalie Murdoch Darwin 433

Reprints Available 437

Editorials 438

Association Activities 439

Membership News 442

General News 443

Index to Current Literature 448

Abstracts 449

Book Reviews 454

List of Approved Schools 456

Meet Our New Contributors 458

Available in a Microfilm Edition.

The Physical Therapy Review

Official Publication of The American Physical Therapy Association

Volume 31 **October 1951** **Number 10**

Amputee Training in Greece

Signe Brunnstrom

There are probably few countries in the world where there are as many amputees in proportion to total inhabitants as in Greece. The actual number can only be estimated. Veteran amputees from various recent wars are said to number eight thousand, and civilians in need of artificial limbs probably outnumber the veterans. An estimated sixteen thousand, therefore, is a conservative figure. For a country with only seven million inhabitants, that is a large number.

In Athens the leg amputees are a conspicuous group. Many are still on crutches and those who use artificial legs walk badly. Some amputees use crutches by choice, since the example given by amputees with artificial legs is discouraging. It does not take the eye of an expert to discover who wears an artificial leg: the amputee usually leans heavily on a cane, the artificial leg sticks out obliquely to the side, and the prosthesis is not trusted to carry the body weight. Each time you see one of them you think "Now, if only I could teach that man how to balance on his prosthesis, he would throw away the cane in no time." It almost becomes an obsession with you. You feel compelled to do something about it.

If you walk down Jan Smuts Street from Venizelos to Churchill Street, more likely than not a young above-knee amputee, using one crutch only, will land in front of you with the speed and grace of a cat, seeming to descend from nowhere and waving a chain of safety pins in front of your nose. He looks 16 or less, has brown, intelligent eyes, a winning smile, and he is so, so insistent that you buy his safety pins. He dances around you, keeping up with your pace, being now in front, now on the side of you, until he finally gives you up in favor of a more responsive customer. Yes, truly, you must do something about it.

Not only men in the fighting forces, but also many civilians, men and women, lost limbs as a result of enemy action or guerilla warfare. The so-called "shoe mines" caused the loss of legs of peasants in the fields and shepherds on mountain paths going peacefully about their work. Disease and infection also took a heavy toll and this, to a great extent, was due to lack of adequate medical care.

The purchase of limbs from private limb shops, of which there are several in Athens, has been and still is out of reach for all but a few well-to-do persons. In the past, some assistance in supplying civilians with limbs was given by the Government and various agencies, but until recently the number of civilians thus receiving limbs was comparatively small. The legs purchased in private limb shops were obtained at extremely high prices. Medical supervision and follow-up was practically nonexistent, and the amputees received no training in the use of the limbs. The results were discouraging. Breakages were common; amputees complained about bad fitting; and many limbs were discarded by their wearers.

Director of Physical Therapy, Kessler Institute for Rehabilitation, West Orange, N. J.

During the UNRRA days (1945-1946), following recommendations made by Dr. Hatcher, orthopedic surgeon from Chicago, machinery and semifinished limbs were sent from abroad, but difficulties were encountered in getting the goods cleared at the docks of Pireaus, and some shipments were said to have remained there for two years.

In 1946, thanks to the efforts of an artificial limb committee, prices were reduced through competitive bidding, medical supervision arranged, and an improved program initiated.* For this limb-fitting project, which was to be administered by the Near East Foundation, the Greek War Relief allocated a sum of $25,000. During 1946 and 1947, two hundred and fifty limbs in all were delivered to civilians, practically all lower extremity prostheses. When the sum allocated by the Greek War Relief had been exhausted, the limb-fitting program slowed down considerably for about two years. The Marshall Plan then came into the picture and funds for the construction of three hundred limbs were made available for distribution by the Near East Foundation through the Ministry of Social Welfare. Some of the legs were purchased from private manufacturers, some were produced at the Army Military Limb Factory. As a whole, dealings with private manufacturers were unsatisfactory and finally, after a considerable trial period, orders were withdrawn completely from private industry.†

The Army Military Limb Factory was established in 1942 for the purpose of supplying military personnel and veterans with artificial limbs. A second factory was opened in Salonika in 1946. Today the Military Limb Factory in Athens is well-equipped and staffed by a crew of 106. It possesses two duplicating machines, one sent from Switzerland, the other from the United States. For the standard type of leg, duplicating is done from wooden models, and, for more complicated and difficult-to-fit stumps, from plaster casts. Seasoned willow wood is imported from England and is shaped into above and below-knee sockets, into knee blocks and into standard types of feet. Wood is the preferred material both for below and above-knee legs. The factory is also equipped for the fitting of light metal legs. A few years ago, the Swedish Red Cross contributed 500 such legs, but these were never very popular. About half of them were used, the rest are still stored at the factory. Suction sockets have been experimented with, but are not being produced at the present time.

As the productive capacity of the limb factory rose, and as military needs decreased, the factory extended its services to civilians. The fitting of civilians on a larger scale was made possible through the Marshall Plan. In May 1949 the American Mission for Aid to Greece and the Government of Greece entered into an agreement, "project Agreement ECA—116," for the specific purpose of providing rehabilitation for amputees. The necessary funds were made available through ECA, and the project was administered jointly by the Ministries of Coordination, Welfare, War, Hygiene and Labor, and the ECA. According to this contract, the Ministry of War agreed to "make available to the Ministry of Welfare for distribution to civilians a minimum of 30 percent of all artificial limbs produced each month." At the present time a larger percentage goes to civilians.

Throughout the artificial limb program, the Near East Foundation played an important roll in distributing limbs to civilians. It performed this service first under the UNRRA, then in cooperation with the Greek War Relief, and lately under the Marshall Plan.

Fitting of amputees in the provinces, however, constituted a major problem. The limb-fitting center in Salonika alone did not solve the problem. In the spring of 1950 an Amputee Hostel was established at Psychico, on the outskirts of Athens, to provide sleeping facilities for amputees from the provinces while they were being fitted with appliances. This hostel, formerly a Children's Home, which was made available by the Ministry of Welfare, is administered by the Near East Foundation as part of its Rehabilitation Center for Disabled Adults. Funds for the maintenance of the hostel, as well as for limbs, are supplied by ECA through the Ministry of Welfare.

The main building at Psychico Hostel contains two dormitories, dining room, kitchen, and offices. Additional sleeping facilities are provided in one of three Nissen huts which have been erected behind the main building, bringing the bed capacity to one hundred. When you walk into the dormitories, you think that you are in an Army camp in the States: the cots are neatly arranged in rows and covered with olive-drab blankets. Here, as in many of the hospitals in Athens, the equipment is almost exclusively American and bears the G.I. mark.

Since the initiation of the civilian limb program, the Hostel has been filled to capacity by leg amputees from the provinces. So far, only male leg amputees have been accepted, this constituting

*Prices agreed upon were Drs. 450.000 for below-knee and Drs. 625.000 for above-knee legs.

†Information on the development of the civilian artificial leg program was received from an orthopedic surgeon who was closely connected with the program from its beginning.

the largest group of amputees in need of rehabilitation. The fitting of women leg amputees from the provinces, by necessity, had to be postponed, as well as the artificial arm program.

In October 1950, when I first visited the Hostel, another Nissen hut was being prepared to house a cobbler and a tailor shop for trade training of amputees, such training having been started some time previously by the Near East Foundation, on a small scale, at the Rizarion Hospital in Athens. The third Nissen hut was standing empty awaiting further developments; the possibility of a tinsmith shop was being considered. This empty hut seemed made to order for my purpose: the establishment of a special training program for amputees so that they could learn to use their limbs properly. The idea of gait training was not by any means a new one at the Hostel. The Near East Foundation had recognized early the necessity of such training. A Greek woman who had spent some months at Roehampton, England, had been employed for the purpose. However, it may be seen easily that individual gait training given in a corridor by a part-time instructor could not possibly meet the needs of one hundred amputees. With the cooperation of the staff of the Hostel, it took only a few days to get a program going which soon developed into a large-scale "show," both for the amputees and for numerous visitors.

For the preprosthetic training, old blankets were spread on the floor, accommodating about thirty amputees at a time. *(See Figure 1.)* The rest of the amputees had to watch the show from the side lines, some sitting on benches, others peeping in through the windows. These classes seemed to provide a great deal of fun for the amputees. The first few days I was afraid that the record attendance was due to curiosity only—including the novelty of seeing an American woman in slacks—but when, after a few days of respectful silence on the part of the amputees, coaching from the side lines began, I was reassured of their genuine interest. The classes were conducted in an informal atmosphere. I soon discovered, however, that it would be a mistake to conduct them too informally; a certain amount of military precision was wanted. If an amputee raised the right arm when I said left, a storm of protest would arise from the spectators. It was as if a major crime had been committed. To satisfy the onlookers, I would have to stop the class and give orders again and see to it that they were followed literally. The onlookers immediately spotted any person who did not do the exercises correctly. As always with classes of this kind, a moderate amount of caricaturing of the wrong way of doing an exercise was effective in producing a great deal of mirth.

Figure 1. Preprosthetic exercises in a Nissen hut at Psychico Amputee Hostel.

At first, only the younger amputees participated in the classes and the older men sat around watching. It did not take much coaxing, though, to get a second class going for elderly men, some of whom were so anxious to show their physical strength and vigor that it became necessary to hold them back constantly, for fear they would overdo. This applied particularly to the more vigorous exercises, such as hopping on the sound leg, an activity which developed into a major competitive sport among the amputees.

While in the States I was once told by some friends of mine, not in the medical field, that many lay people object to the word "amputee," which they find "horrible," and I was asked if there were not a more desirable term which could be used. At the time I could not think of any, but I am happy to report that the Greeks have a word for it! A person who has lost a leg is called a monopod, and that is an expressive and nice-sounding word, so why not make use of it?

Well, in the field of preprosthetic ambulation, the Greek monopods can teach us a lesson. It is not necessary, by any means, to use two crutches. A long shepherd's crook which is placed slightly on a slant is used for a sort of pole-vaulting gait, one hand hanging on to the crook overhead and the other one bracing the pole. Locomotion in this manner is swift, graceful, and practical, particularly in mountainous terrain where obstacles can be overcome with apparent ease. Other monopods use one crutch only, made out of a tree branch, chosen in such a manner that one horizontal branch

fits into the axilla and another one can be used for a hand grip. Often the hand grip is missing altogether. One crutch is sometimes used in combination with a cane in the other hand, but quite often only one support is used, which leaves the other hand free for carrying objects and opening doors. One of the major objections to crutch walking, that of having both hands occupied for locomotion, is thus overcome. Walking with one crutch, though, is not too easy to learn, as anybody who wishes to experiment will readily discover. It takes a great deal of practice, and most monopods in the States would be fitted with legs long before they could learn to use one crutch comfortably and effectively.

With all these irregular types of crutches, good crutch walking, according to standards used in the States, could not always be taught. However, those men who arrived with two crutches or who were supplied with crutches at the Rehabilitation Center were checked for crutch length and position of hand grip. Because of the large number of men and frequent new arrivals, it became necessary to do such checking every three or four days. The newcomers were asked to step forward, and for a quick evaluation of the length of the crutches I would place two fingers in the axilla, one in front, one in back, and walk alongside the monopod. It could then be felt whether or not there was any pressure. The new men, at first, would be rather bashful about stepping forward, but once the hesitancy had been overcome the checking proceeded without interruptions. After a few days I was surprised to see such a long line forming; those who had been checked previously were also standing in line. Not only did they want personal attention, but they were also anxious to show off in front of the others. This facilitated my work, for although I had to check the same man over and over again, the ones whose crutches were well-adjusted and who used them well could pass in front of me quickly and serve as good examples to the others. Thus, as a general inspecting his troops, I reviewed the crutch walking of a long line of men. Occasionally, one of the boys, a funny little monopod with a humorous twinkle in his eye, would come forth and exhibit the most horrible type of crutch walking imaginable, with all the faults to be avoided which I had pointed out at previous times, and everybody would roar with laughter. That all fitted very well into the instruction program, for it was an excellent demonstration to the newcomers.

Among the monopods at the Hostel were several who had been waiting 15 to 20 years for legs, and many more who had been without legs for 5 to 10 years. The effect on body symmetry of prolonged one-legged standing and walking was obvious. The shifting of the trunk toward the side of the supporting leg had become more or less permanent and proved quite an obstacle when the monopod was to learn to distribute the body weight evenly over both legs or to balance on his prosthesis. Whereas previous observations on fairly recently amputated persons in the States had indicated a tendency toward lowering the pelvis on the side of the amputation, it was found that among the Greek monopods the pelvis was comparatively level, but that a marked trunk displacement toward the side of the sound leg was present. Unfortunately, with a crowd of a hundred monopods in need of attention, and with the training program conducted by me as a "spare time activ-

Figure 2. Starting position for "side rocking" to increase spinal flexibility and strengthen lateral trunk muscles.

Figure 3. Group exercises: weight transfer over prosthesis and "fall out" forward.

ity,"* time did not permit a closer examination of individual persons, let alone the collection of objective data. This was deeply regretted, for here was a golden opportunity for research of a kind which could not be found in the States. However, urgent human needs must be met first, and in such a situation it seemed impossible to disappoint the individual for the collection of figures, no matter how strongly I was aware of missing an opportunity.

When a monopod with a well-established one-legged balance attempts to transfer the body weight laterally over the prosthesis, in addition to the usual insecure feeling common to all prosthetic wearers, he also experiences physical difficulties in bringing the trunk over toward the side of the prosthesis. This was particularly noticeable in the older age group where general spinal flexibility was poor. Intensive preprosthetic exercises were instituted in an attempt to increase flexibility and facilitate the restoration of body symmetry. Emphasis was given to lateral shift of the pelvis in the back-lying position, to sitting "rocking" from side to side *(See Figure 2.)*, to trunk shifting from left to right with a stabilized pelvis, and to trunk twisting in the sitting position on the mat. During the prosthetic training, weight transfer toward the side of the prosthesis was practiced in many forms in order to relieve the monotony of repeating the same exercise a large number of times. Group work greatly facilitated the learning of balance on the prosthesis. Whereas each individual man was most anxious to walk immediately after he had received a leg, even if he had to lean heavily on a cane, in the company of others he would willingly participate in group exercises and drill without using a cane. *(See Figure 3.)*

Every attempt was made to keep the monopods from walking too soon. The established practice of issuing a cane to each person when he received his leg did not exactly further the training. Many a time I cursed the canes, for my work in the morning would often be nullified by the use of canes in the afternoon, and the next day we would have to start all over again. Frequent hints to the administrator of the Rehabilitation Center and to the doctor who conducted the evaluation clinics that canes should not be issued routinely were of no avail. The Ministry had ruled that a cane should be issued free of charge to each monopod, and such an order could not be disregarded; furthermore, it was pointed out, a man would feel cheated if he was not issued what was coming to him. Nobody seemed to realize what a liability a cane is in the

*The primary purpose of my trip to Athens was to conduct a school of physical therapy.

Figure 4. Above-knee amputee descending stairs foot over foot.

Figure 5. Balancing on board for above and below-knee amputees.

training program and how, in many cases, canes are responsible for poor gait. It should be added that, to the villagers, the use of a cane did not seem a sign of a physical handicap, but rather a distinction. Possibly the carrying of canes for leisurely walking by well-to-do people in Europe, so common in the past, contributed to this attitude. Nothing else remained except to try to kid the men out of the habit of using canes. Once a few of the younger men had learned to walk well without a cane, the task became somewhat easier. They set a good example and gave me wholehearted support when it came to weaning others away from their canes.

Since the weather is never very cold in Athens and the sun is practically always shining from a cloudless sky, the out-of-doors could be used extensively for training. Some of the above-knee amputees became highly skilled in descending stairs foot over foot. *(See Figure 4.)* Balancing on a board, which was part of the daily practice *(See Figure 5.)*, seemed too easy to one of the below-knee monopods and before I could say "stop" he was performing his stunt in a more dangerous and challenging way. *(See Figure 6.)* This man was also an expert in high jumping *(See Figure 7.)*, an activity which he taught to several of the other men. Various out-of-door games were organized at a later date as part of the program by graduates of the Academy of Physical Education who enrolled in an amputee instructor course. (See later text.)

From the standpoint of amputation surgery,

Figure 6. An enterprising below-knee amputee.

Figure 7. High jumping by below-knee amputee.

much remained to be wished for among the men at the Hostel. Ugly shaped stumps, with extensive and adherent scar tissue at most undesirable places, were common. Below-knee stumps were often so long that the flair of the bones above the malleolei remained, and the fibula more often than not was as long or longer than the tibia. Indurations, corns, excessive soft tissue masses, or abrasions were frequently seen. Yet, in spite of these most unconventional amputation lengths and shapes, many stumps had been standing up well among men who had been wearing legs for years. The orthopedist who conducted the clinics had had much experience in the observation of such stumps. Only exceptionally, and for very specific reasons, did he prescribe a revision.

The irregularity of the stumps cannot be attributed to lack of proper amputation technic among the surgeons of Athens, since some of the amputations were of long standing, others had been hastily performed under war conditions to save life, without the benefit of proper after-care or revision, and others were found among men from far-off villages where no medical aid was available. The latter held true in the case of a young bilateral amputee who had one particularly ugly-looking below-knee stump. When asked who had performed the amputation, he answered, "Nobody." His story was that he had had an infection in the feet and that the legs had gradually turned black and wilted away. "Finally," he said, "we tied a wire around the leg and pulled the dead part off." He stated that he had received no medical care until after both legs were off. This may sound like a story to those who are not familiar with the primitiveness of life in a Greek mountain village, but it becomes quite plausible to anybody who has visited such villages and seen how the people live.*

It was quite an experience to see what inventiveness some of the men had used in constructing their own appliances or in repairing and adjusting old legs. Peg legs of numerous varieties were in use, sometimes very effectively. The knee-bearing type of peg leg for a below-knee amputation was common. Legs of "ancient" make, inherited from a grandfather or some old villager, had been patched up to serve their new wearers. Clusters of wire, pieces of harness, odds and ends of metal, leather, and clothing were combined to make the leg usable. One double below-knee amputee had made his own footless appliances of metal on which he strutted around energetically and cheerfully. He was nicknamed "Corned Beef Hash," presumably having made his legs out of American corned beef hash cans.

Not possessing a leg of your own does not necessarily mean that you cannot participate in balancing and walking. One enterprising middle-

*The women carry the water supply for the entire family from a well in the center of the village; meals are prepared on open fires outside the houses; electrification has not as yet reached the villages; sewage system is nonexistent; medical or nursing care is unavailable; roads are often so bad that an automobile cannot reach the village.

aged man from Crete, who several times had entertained us with Cretan folk music played on a small lute, one day appeared in the prosthetic class and went through the whole routine on a leg he had borrowed from a fellow in the hospital. Noting that the leg was very short and did not seem to fit particularly well, I was all ready to make an appointment for him to go to the Limb Factory when he confessed that the leg did not belong to him. Nothing could persuade him to stay off the leg; he was not going to waste his time just being an onlooker. Strange as it may seem, this practice on a leg made for another person did not cause any blisters or do any harm, although I believe our Cretan friend did not mind sitting down toward the end of the training period, when I asked him to play some music for us so that we could dance. And dance we did, on two legs, on one leg, on crutches, or just clapping hands in cadence with the music. An expert dancer, a Cretan employed at the Hostel, took the lead, the others following in a winding, waving row in the usual Greek fashion.

Although the training program was developing nicely, it seemed of little value for the future unless arrangements could be made to train Greek instructors to carry on after I had left. For this purpose it was necessary to convince the authorities, both military and civilian, of the value of amputee training. This was attempted in several ways: by showing rehabilitation films, by giving talks and demonstrations at public and private meetings,* and by inviting people to attend the daily training classes at the Hostel. This last activity was perhaps more effective than anything else. Word about this program got around and in spite of the early hour—classes started at 8:15 sharp—little by little, representatives of the various Ministries, the British and the American Military Aid groups, the Health Division, ECA, the Military Limb Factory, and the Greek Veterans Administration attended and voiced their approval. At the formal opening of the Amputee Hostel on March 7, 1951, a group of amputees, led by a student of mine, gave a performance in front of Her Majesty the Queen. *(See Figure 8.)*

The permanence of the training program hinged on two factors: the training of instructors and their subsequent employment. For a while the picture did not look too bright, because of the enormous amount of red tape involved before decisions can be reached in any Greek governmental department, and the frequent necessity for consultation with ECA officials as well. Given moral support and physical assistance by the Near East Foundation, I finally decided to take the matter in my own hands, regardless of what the after-effects might be. The Director of the Academy of Physical Education, whose acquaintance I had made by paying a visit to the Academy, was most helpful in sending for interviews a number of graduates who were either unemployed or employed part-time and who, therefore, would be able to attend instruction. Finally, in early February, a group of physical education graduates had been lined up, who were willing and eager to take the course, regardless of whether or not they would be employed afterwards. The Ministry, faced with the fact that the course would start in a few days, was most anxious to become the sponsor of the course. In a broadcast over the Athens radio, the Secretary General of the Ministry of Social Welfare promptly announced the beginning of the course. This interest was most encouraging, but, unfortunately, after the course had already started, the Ministry decided to attach some security strings to its endorsement. It required the participants to sign a paper, the content of which, because of its Greek text and its varied interpretation, never became quite clear to me. A representative of the Ministry of Social Welfare looked upon it as a purely routine matter. The students, on the other hand, claimed that it

Figure 8. Her Majesty the Queen congratulates a double-below-knee amputee on his performance.

*In all, fourteen lecture-demonstrations or film showings were given, all dealing with rehabilitation.

meant a commitment on their part to accept employment at any place and any time chosen by the Ministry. Most of the students opposed the signing of the paper. Three of those originally selected resigned from the course rather than comply with the Ministry's request.

A Greek medical student with a good knowledge of the English language volunteered his services as an interpreter for my lectures, and the course finally got under way with five women and seven men, all graduates of the Academy of Physical Education, participating. Clinical practice was arranged at the Hostel, at the Limb Factory, and at Rizarion Hospital in Athens, and daily lectures were held, using teaching material, including a skeleton, made available by the Near East Foundation. My students and I shared a feeling of pride and satisfaction when the course came to an end eight weeks later, and certificates of completion were handed out to the twelve participants by a representative of the Ministry of Coordination, in the presence of the Foreign Director, Near East Foundation, and a representative of the Ministry of Social Welfare. The course thus received the stamp of approval of the government. Two of the graduates were employed shortly after the completion of the course, with a promise of further employment as the training program developed.

The logical place for the establishment of amputee training was the Army Military Limb Factory. The colonel in charge of the Limb Factory was most anxious to have a "walking school" started. Quarters at the Limb Factory, however, were cramped, and additional space was needed for the walking school. Such space was only obtainable by closing in an open area between two buildings. Architects were called in, and, after much discussion, disagreement, redrawing, and finally a complete change in plans, a solution was found which was agreeable both to military and civilian authorities. Thereafter, the plans were approved by the Government Rehabilitation Council and funds were allocated. Construction was scheduled to start the first week in May 1951, five months after the matter had been theoretically decided upon. Although I never saw the Limb Factory's "walking school" in operation before leaving Greece, it was satisfying to know that the building was under way and that personnel was available for employment as soon as the training area had been completed.

Rehabilitation of all types of disabled persons is urgently needed in Greece. Seeing the amount of work which should be done and having to proceed so slowly on all fronts is a frustrating experience. The physical therapy school could not get under way because of a legislative hold-up, but, at least in the field of amputee rehabilitation, something was achieved. It was a drop in the bucket, to be sure, but even a small amount of success makes you rejoice when you have worked hard for it.

Fibrositis*

James Mennell, M.A., M.D., B.C. (Cantab.)

Diagnosis

It is probable that few diagnoses are made as frequently as that of fibrositis, and yet, if the request was made for an exact definition of the pathological condition causing the symptoms, it would be with reluctance that most of us would set about the task. Yet, unless the cause of the conditions is suspected with reasonable accuracy, the prescription of scientific treatment becomes impossible. Books have been written, extending into many pages—even hundreds—and so condensation into a short article is not only difficult, but omissions are inevitable.

Causes

1. *Dietetic Errors.* In this country perhaps the commonest dietetic error concerns fluids more than solids. It may be taken for granted that the amount of fluid given off to the outside world, mainly by kidneys, skin, and respiratory organs, amounts to three pints a day. Solid material absorbed in this moisture enables each of us to get rid of our waste products. If, therefore, the daily diet contains less than three pints of fluid all told, the chances are that waste products will collect in the tissues. It is no doubt true that the kidneys are able to squeeze a little extra fluid out of what appears to be mainly solid food, but it is an unfair task to set them, as they can only cause a certain amount of solid to be dissolved in a certain amount of fluid. To push this process to a maximum means that there is no margin left for extra exertion and so waste products are likely to accumulate. This no doubt explains why it is customary, as part of ordinary Spa treatment to increase the fluid intake to six pints of "the waters" every day. The analysis of the waters varies at almost every Spa, and therefore it is presumably the ingredient common to them all that does the good, namely the water. It may be that this is only a part truth, but people who habitually reduce fluid intake to less than three pints are running considerable risk of developing fibrositis. One very striking case occurs to memory, in which a girl of 23 was a complete misery, and so sore and sensitive from head to foot, that even the lightest examination was impossible. The skin, also, was covered with pimples. On enquiry, the total fluid intake for twenty-four hours was one teacupful of tea. She was advised to increase fluid intake up to four pints a day, gradually, and report in two months. The skin had cleared almost entirely and the general aches, pains, and sensitiveness had so nearly disappeared that no other treatment was necessary.

Then, there is no doubt of the truth of the adage that "one man's meat is another man's poison." There are plenty of people, for example, who know that if they take a single glass of port wine after their dinner at night, they will suffer from pain in the lower part of the back the next morning. Some fruits, strawberries for example, may have the same effect, and so examples may be multiplied, almost ad infinitum. The only advice to be given under these circumstances is to ask the question: "Is repetition of the known error worth the penalty?" To discover the cause may require careful examination and the only distinctive element in attacks of this sort is that they are usually of very short duration, unless the error is repeated at unduly frequent intervals. Probably the best remedy is copious fluid intake till the attack is over.

A somewhat similar type of attack may follow a turkish bath or other form of application of general heat in patients who do not perspire as freely as most people. This accounts for the fact that there are patients who visit the Spas, where treatment is inevitably associated with heat, and who go to the Spa "under their own steam" and are likely to return on a stretcher. This, of course, occurs only when people are not under careful medical supervision, or deliberately conceal the fact that the sweat glands do not work efficiently.

Of recent times another common dietetic error is lack of one of the vitamins, and particularly of vitamin B. Also the faith so often laid on the value of green vegetables is now known to be concerned, very largely, with chlorophyl. What this material may be, and therefore what part it plays, is not known; but the fact remains that as a deodorant

*Reprinted from the February 7th issue of *The Medical Press*, Vol. CCXXV, No. 6, 1951.

Hon. Consulting Physician in Physical Medicine, St. Thomas's Hospital, England.

it may be striking, and particularly in people who are afflicted with such varying complaints as unpleasant aroma from sweat glands, from the breath, and even from wounds which fail to heal, such as those of osteomyelitis.

2. *Septic Processes.* Of these probably the most common is infection at the root of a tooth. An undue importance is attached to the value of X-ray examination. When this is positive and erosion of the bone is visible, it is obvious that any tooth should be condemned and should be removed under gas, and not by local injection, as this tends to drive live bacilli deeper into the bone. Also the removal of any tooth with a septic root is often a surgical operation which wrongly fails to be regarded with the consideration it deserves. The size of the raw surface left by extraction is always large and it is exposed to living bacilli. So, if several septic teeth are to be removed, it is always wiser to remove two, or at the most three, at one sitting, or the patient is likely to receive an undue dose of live vaccine. The risk is all the greater if evidence is present of widespread infection in the form of fibrositis, arthritis, or other infection, and particularly such things as pyelitis or cyclitis. The much debated point of the preparation of a vaccine from the root of a tooth is of real importance. After all, if a root infection is the cause of symptoms and the tooth is removed, it is difficult to understand why vaccine treatment should be necessary for the treatment of a cause that has been eradicated. On the other hand, root infection is a closed one and if another root should happen to be infected, this infection will increase during the negative phase of vaccine treatment to an extent that often far exceeds any benefit that is likely to accrue during the positive phase. This is a real danger and applies only to closed infections.

It is a fair presumption that for bone erosion to be visible on X-ray examination, it either means that the infection has been very acute or has been present for a very long time. In the former event it is obvious that infection, adequate to cause symptoms, may be present in spite of an apparently clean bill of health. It ought to be a universal rule to examine dental X-ray photographs with a strong magnifying glass, to find out whether the lining membrane of the root is intact or blurred. If the photographs are not good enough to show this, one way or the other, the examination should be repeated. Should symptoms first appear between the ages of 40 and 50, without other apparent cause, any tooth that has been crowned, or in which the nerve is probably dead, should be removed and the roots examined bacteriologically.

After any root has been removed, if improvement is not obvious, the tonsils are probably the most common cause of general infection leading to fibrositis. The fact that they have been removed once is not proof positive that all deep-seated infection has been eradicated. If the cervical glands are enlarged, suspicion should change to condemnation, after expert examination confirms it as desirable.

Infection of the air-spaces should never be neglected, as a "silent" antrum is often a focus of infection.

Abdominal infection is not uncommon, but haphazard medication, as for instance with lactic acid bacilli, is merely a shot in the dark. Needless to say, more than one cause may be operative.

The main point of all this is that an attack of fibrositis should always be regarded as a danger signal, signifying that the patient is, as it were, sitting on a volcano.

3. *The Skin and Subcutaneous Tissue.* Any bruise is a potential cause of fibrositis in the area affected, and if a fibrositic attack is obviously localized in one area, even though it may be extensive, the skin should be rolled between finger and thumb. A so-called local and chronic fibrositis may be due merely to adhesions between the skin and the deeper tissues. Deeper still we come to the deep fascia which is so extensive that, next to the skin, it is probably the largest organ in the body, and may be even larger than the skin, as prolongations from it must be included. All fascial planes are endowed with mobility. They consist almost entirely of white fibrous tissue and are not, therefore, truly elastic, and still less do they have any power of contractility. On the other hand, if, for any reason, their mobility is lost, the function of general mobility must be disturbed. Loss of normal mobility is, in part, a natural process which begins as soon as the child begins weight bearing and progresses steadily throughout life unless maintained by movement, exercise, and function. The main causes of abnormal loss of mobility are injury and immobility—relative or complete—particularly if associated with lack of adequate movement during septic illnesses. Loss of joint mobility, from any cause, must involve a certain degree of immobilization of the fascial planes covering the muscles responsible for controlling movements of the joints involved. This is a very important point when considering treatment.

The above are probably the only conditions to which the word "fibrositis" can be scientifically applied without some qualifying word to indicate the cause.

The common diagnosis of myositis or fibromyositis is very seldom justified, as so-called muscular

rheumatism very seldom has anything to do with muscle fibres, but only with the fascial lining and particularly with the fascia of the intermuscular septa.

Symptoms

The patient's complaint is pain which may be acute, sub-acute, or chronic. It may also be purely local or widely distributed. Moreover, the patient will usually be convinced of a cause for the symptoms, and, however fallacious this idea may be, it is often with difficulty that it can be eradicated. The commonest cause of all is chill or draught. It seems to be beyond doubt that chilling often precedes the onset of symptoms, but it is more than doubtful whether it is the sole cause. A good example is the patient who complains after driving a vehicle with the window allowing definite draught to be felt; yet that individual may suffer the identical circumstances daily for months without any trace of discomfort, and the same applies to countless fellow travellers. It seems certain that chilling does, to some extent, reduce the resistance of the body to infection and that, if a septic focus is present, the balance of resistance to it is upset and this allows it to gain the upper hand. This also applies to attacks from deficiency causes, as well as to definite infection. Also, one of the effects of chilling often is to cause muscular contraction to occur as a reflex response, to try to protect the part affected. In other words, it is quite a possibility that the reflex contraction lays strain upon the joints, which, if long continued, may cause a binding of joint surfaces. It is surprising how frequently a patient, who apparently suffers from an acute attack of stiff neck after sitting in a draught, can be relieved, almost instantaneously, as the result of the restoration of a lost mobility in one or more joints. The same may be said of other conditions known by such indefinite diagnoses as neuralgia, neuritis, sciatica, and lumbago.

All these complaints are liable to occur immediately following some unusual exertion, and it is almost impossible to believe that any unusual strain will produce, as a sole cause, attacks of any of the conditions mentioned, which are so commonly grouped together under the term, "rheumatism." The binding of joint surfaces is probably the most common cause of acute symptoms when they arise immediately after exertion, though muscle injury is always a possibility, as are many other conditions—such as synovitis, traumatic arthritis, and strain of the fascial planes.

Another sad example of mistaken diagnosis is the acute pleurodynia that so often follows exertion and which is so commonly associated with "rheumatism," instead of being attributed to the true cause, i.e., a binding of the costovertebral joints. If treated as rheumatic, symptoms are liable to drag on indefinitely: if treated by "unlocking the lock" relief may be obtained instantaneously and be followed by complete recovery in a few days. After all, if symptoms are due to the binding of two joint surfaces on one another, no treatment will be effective until the lost mobility has been restored.

Still the fact remains that a very acute attack of pain may directly follow indiscretion, such as lying on damp grass after exertion sufficient to cause profuse perspiration, and it is probable that things of this sort are capable of producing a true fibrositis.

Examination

It is customary, when a diagnosis of fibrositis is made, to find that painful joints can be discovered on pressure over the affected areas, and nodules, which may assume the proportions of sensitive masses, may be felt. There is usually some definite loss of mobility which may be very obvious or which may only be discovered after careful examination in an optimum position. It is impossible, for example, to discover a slight loss of mobility in the neck region while the patient is standing or sitting, as the full range of movement cannot be attained unless the normal forward curve in this region is eradicated by placing the patient in the recumbent position.

Treatment

Dietetic. It is always a wise precaution to increase fluid intake to about six pints a day, so, as it were, to flush out waste products as far as possible, and caffein—combined with salicylates—is probably as useful a remedy as any other, though a really severe attack may justify the use of morphia.

Heat. This is amongst the most popular of remedies, and the safest and best form is probably conducted heat, particularly if it can be provided with an element of support in the form of a hot-water bottle, heated sand-bag, or kaolin poultice. Radiant heat, either from an ordinary incandescent lamp or from an infra-red lamp, is often of service. The amount of infra-red rays emitted from a coal or wood fire is often very large, and the same applies to an ordinary electric or gas stove.

It is wise to remember that any remedy requires proper dosage and that an overdose frequently

does more harm than good. This particularly applies to the use of deep heat in the form of diathermy, either short or long wave. The promiscuous use of these remedies should be condemned, as they are by no means free from the risk of flaring up the symptoms and of doing definite physical harm. This particularly applies if any medicament has previously been applied to the surface of the skin in the form of ointment or liniment. To a certain extent it applies also to the use of other forms of heat, but nothing like to the extent of the use of deep heat.

Cold. Except in ophthalmic work, the use of cold has dropped into abeyance, yet there is no doubt that it is often of very great service in the type of conditions that we are now considering. The technic of application is important. It is best administered by spraying the affected area with ethyl chloride from a considerable distance. This process is continued till the first sign of blanching appears, when the spraying should cease at once and the whole area should be rubbed lightly with a warm hand. This process should be continued three times and no more. One precaution is essential, namely that there is always a tendency for the minute drops from the spray to coalesce and to trickle down the surface of the skin in a small stream. Rubbing the surface with a warm hand, should it occur, is all that is required to prevent burning. Careful watch should be kept for this and particularly if it leads to clothing.

The rationale of this treatment—which may have a very dramatic effect for good—is not certain, but is probably due to the chemical action of a histamine-like substance produced by the spraying.

Massage. Next to the prescription of heat, that of massage has been perhaps the second most common remedy prescribed, when fibrositis has been suspected. Unfortunately, like so many other good things, abuse of the treatment is common, mainly because it is not made clear to the physiotherapist what the objective may be. It is also unfortunate that so many people pin their faith upon one form of massage, to the exclusion of all others. This has been largely due to confusion of thought amongst prescribers. There are still many patients who feel that they are not "getting their money's worth" unless massage causes pain and discomfort, and many physiotherapists labor under the same delusion. Then, too, we have to consider what may be the pathological cause of sensitive nodules and masses that can so often be felt, and which so often disappear, temporarily, as the result of deep massage. A common delusion is to suppose that these masses contain something which can be literally rubbed away, presumably something in the form of crystalline or other deposits, which are shifted into the blood stream and so dispersed. A much more likely solution of the problem is that there is a focal point which acts as a trigger-point; which, in turn, causes reflex protective spasm of muscle fibres in chronic protective spasm. If there is one treatment more than another that is calculated to reduce muscle spasm, it is pressure, and, if diligent search is made, it is quite common to find some one definite point that seems to be the center of the disturbance. When this can be found, simple pressure over this point, without movement, seems to be the most efficacious treatment. For the first minute or so, the treatment may be definitely painful, during the next half minute it becomes less sensitive, and at the end of two minutes the pressure should cease to cause discomfort. The reexamination will often reveal that the nodules or masses have disappeared. This should not be the end of treatment, because spasmodic muscles are producing waste products at an abnormal rate; and, owing to the absence of the necessary relaxation, the pumping action of the muscles is lost and so the venous and lymphatic circulation cannot perform their function of removing waste products. Pressure, by relieving the muscular spasm, allows relaxation, and then very little in the form of treatment is required to disperse the waste products which may have accumulated. It seems likely, therefore, that any benefit received from massage, in cases where sensitive masses can be felt, is due to the pressure, and it seems obvious that if the pressure can be applied exactly over the trigger-point until relief is experienced, the result will be more efficacious and more rapidly attained than if massage is administered promiscuously in any form. Also the discomfort suffered by the patient will be relatively short-lived and is usually not so severe as with other forms of effective massage. If treatment is to be successful, the return of symptoms should be more readily overcome with each treatment until the symptoms disappear altogether. If no improvement takes place within two weeks, either the cause is still operative or the technic has been at fault.

Sometimes patients are too sensitive to allow adequate treatment on these lines without other assistance, which can be given by local injection with a 1 percent solution of procaine, but it is essential that the injection should be given exactly into the trigger-point, which may be situated at some distance from the center of the spasmodic mass. If this cannot be localized with accuracy by pressure, surface stimulation with a faradic current may reveal a pinpoint of exquisite sensitiveness,

or may reveal that the sensitiveness is spread over a relatively large area. In the latter case, exposure to a reaction dose of ultraviolet light will often reduce the general sensitiveness sufficiently to discover the exact position of the trigger-point. Failing this, and particularly over an exposed area, a concentrated dose of galvanism will often serve to relieve it. This is commonly known as disc-galvanism.

When skin-rolling reveals the presence of adhesions in the subcutaneous tissues, the continuance of the skin-rolling is the ideal treatment. Very often it is so painful as to be intolerable, and, in this event, cupping with a labile Bier's cupping glass will render manual treatment possible. It is essential to begin the cupping away from the sensitive area and approach it gradually. If this treatment, in turn, is too painful, subcutaneous infiltration with oxygen will often succeed where all other treatment has failed. Unfortunately this involves really hard work on the part of the administrator of the treatment, as it is essential to guide the gas, with the hands, in the direction required by massage, so as to prevent the gas from following the path of least resistance. In any event, manual skin-rolling should be painless before treatment can be considered complete.

When the symptoms are due to tight fascial bands, these must be stretched manually, and by teaching the patient to do it for himself by specially devised exercises. Again, the manual treatment involves very hard work.

When there is definite limitation of movement at any joint, it is always likely to be accompanied by reflex spasm either of a whole muscle or a relatively few fibres within a muscle. We have already seen that this may be a cause of so-called fibrositic nodules or masses. It is therefore practically impossible to relieve the symptoms when they arise in muscles which play any part in the movement of a joint in which normal mobility is lacking. Perhaps the most common example is when normal mobility is lost in the joints of the cervical spine. This accounts for the fact that manipulation of the joints in this region is among the most satisfactory of all joint manipulations.

An Adjustable Foot Support

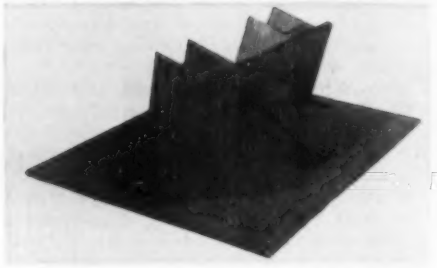
Mabel E. Holton

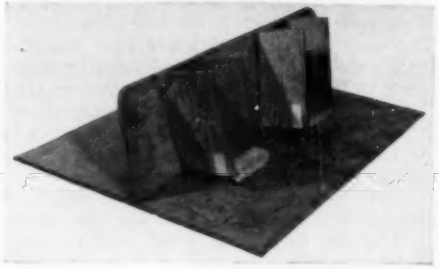
Many devices have been used at one time or another to hold the feet of a weakened or paralyzed patient in a position which will either prevent or correct a deformity. One type widely used has provided a box-like compartment for each foot. This simple type did not prove entirely satisfactory for two of our patients. One was a small child with poliomyelitis who had developed a foot drop. To correct this, the portion against which the feet rested was hinged as illustrated. A turnbuckle made it possible to change the angle daily, and thus correct the foot drop with little discomfort.

A second child suffered severe burns on trunk, thighs, and legs. She too developed a foot drop, but could not be placed in the conventional support because of wide abduction of both legs. It was hoped that this abduction could be corrected as the burns and skin grafts healed. Therefore a second modification was made. The guards holding the feet were made as separate boxes attached to the upright support by bolts and wing nuts through a horizontal slot.

The foot board as illustrated is made of ½" plywood. The upright is hinged to and controlled by a turnbuckle to allow a variation in position or to facilitate stretching of the plantar flexors. Slots in this upright board allow lateral adjustment of the foot guards. A small piece of sponge rubber is placed under the ankle to prevent pressure on the heel. This can be attached to the foot piece and moved with it. A roll of sponge rubber, towel, or small blanket should be placed under

Supervisor of Physical Therapy, W. A. Foote Memorial Hospital, Jackson, Michigan.





the knees to prevent hyperextension of the knees and pressure against the board. Cotton padding or towels may be used at the soles and sides of the feet for comfort and cleanliness and to maintain position. This foot support will not tip and can be moved to any position desired on the bed or placed on a stretcher or plinth for transportation or during exercises.

The board illustrated was made by the hospital engineer. It can be made to fit patients of all ages and sizes by changing the size and angle of the foot guards.

SUMMARY

An adjustable foot support is described, which is easily made and is adaptable.

Performance of the Finger Flexor Muscles*

Natalie Murdoch Darwin

A study of finger flexor power was undertaken to determine relative strengths of the muscles acting upon various segments of each finger and also strength comparisons among the four fingers. These data should be of interest in muscle testing and in muscle reeducation of the hand. As a part of this study, finger dexterity was also tested to determine whether any correlation existed between strength and dexterity. In this report, when reference is made to strengths of the individual muscles, such as the flexor digitorum sublimis, and interossei and lumbricales, it should be remembered that action of the finger muscles is closely interrelated and none can be completely "isolated" for testing, except the flexor digitorum profundus.

Tests were done on both hands of thirty women 22 to 42 years of age. All of the subjects were physical therapists or students of physical therapy, except two, of which one was a housewife and the other a physical education instructor.

Dexterity of the fingers was determined by use of the Purdue Pegboard, which is a standard test of manipulative dexterity. This test was administered according to the routine instructions for its use.

The flexor strength of the muscles was determined both by an "isometric contraction test" and a "break test." The isometric contraction test is defined for purposes of this study as the measurement of a maximal contraction of a muscle without motion of any of the segments it ordinarily moves. That is, the origin and insertion of the muscle are not allowed to approximate each other as the muscle contracts. This is possible if the segments are held in position by the contraction of other muscles or by forces outside the body, such as immovable resistance.

The break test is the measurement of the amount of resistance which must be exerted against a contracted muscle to overcome its maximal pull. It is the measure of the amount of force necessary to move a segment in a direction opposite to that of the fully contracting muscle.

Strength measurements were made with an electronic instrument developed by Dr. Willis C. Beasley of the National Institute of Health, United States Public Health Service, Bethesda, Maryland. The apparatus records in pounds the amount of pressure exerted on a manual force gauge. Special equipment was constructed for this study for the purpose of transferring to the force gauge the pressure exerted by flexing of the finger. *(See Figures 1 and 2.)*

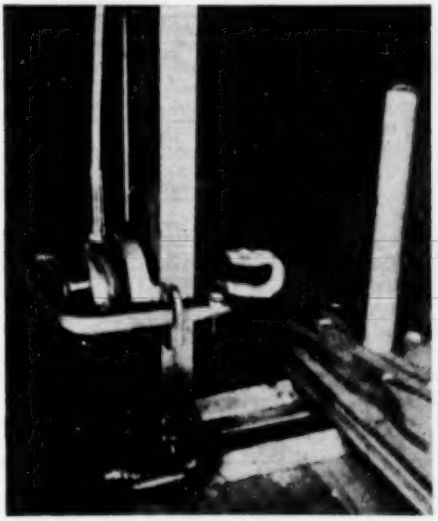


Figure 1. Manual force gauge apparatus ready for use. Force gauge is in place on left side of metal upright, opposite finger sling.

*This material is an abstract from the thesis submitted to the Division of Physical Therapy, Stanford University, in partial fulfillment of the requirements for the degree of Master of Arts. The material, which was reported at the Annual Conference of the American Physical Therapy Association in June, 1950, was prepared with the aid of a grant from the National Foundation for Infantile Paralysis.

Physical Therapist, Hillcrest Memorial Hospital, Tulsa, Okla.

Figure 2. Subject demonstrating isometric flexion test for metacarpophalangeal joint of index finger.

In the isometric test the gauge and the brace for the hand were first adjusted to the proper position and then fixed in this position. In the break test the hand brace was fixed and pressure was exerted against the flexed finger by means of the gauge.

Tests of the finger flexor muscles were made at the joints at which they are considered to act as prime movers. The position and stabilization for each test were designed to eliminate as much as possible the action of other muscles which are also capable of producing motion of the joint. The position of each finger segment followed the generally accepted procedure for testing of the flexor muscles. All fingers except the one being tested were flexed around the hand brace. The forearm was in the neutral position and the elbow was flexed. In testing the flexor digitorum sublimis, flexion at the distal interphalangeal joint was prevented by a metal splint in order to eliminate as much as possible the action of the flexor digitorum profundus.

Figure 3 shows the percentage of the total flexor

COMPARISON OF FINGER FLEXION STRENGTH IN POUNDS N=30

ISOMETRIC CONTRACTION TEST								
	RIGHT HAND				LEFT HAND			
PHALANX	INDEX	MIDDLE	RING	LITTLE	INDEX	MIDDLE	RING	LITTLE
DISTAL	23.6 % / 15.04 lbs.	32.3 % / 20.6 lbs.	26.8 % / 16.9 lbs.	17.6 % / 11.2 lbs.	20.8 % / 12.9 lbs.	32.4 % / 20.1 lbs.	28.2 % / 17.5 lbs.	18.6 % / 11.5 lbs.
MIDDLE	25.0 % / 22.8 lbs.	31.1 % / 28.3 lbs.	26.4 % / 24.1 lbs.	17.5 % / 15.9 lbs.	24.9 % / 22.6 lbs.	30.4 % / 27.4 lbs.	26.9 % / 23.6 lbs.	18.8 % / 17.0 lbs.
PROXIMAL	29.1 % / 12.2 lbs.	27.0 % / 11.3 lbs.	25.5 % / 10.7 lbs.	18.4 % / 7.7 lbs.	30.2 % / 11.8 lbs.	27.1 % / 10.6 lbs.	22.5 % / 8.8 lbs.	20.2 % / 7.9 lbs.
BREAK TEST								
DISTAL	24.8 % / 20.6 lbs.	32.5 % / 20.7 lbs.	24.6 % / 20.4 lbs.	18.1 % / 15.0 lbs.	24.9 % / 20.0 lbs.	31.4 % / 25.2 lbs.	24.6 % / 19.8 lbs.	19.1 % / 15.3 lbs.
MIDDLE	25.1 % / 29.9 lbs.	30.9 % / 37.0 lbs.	26.6 % / 31.8 lbs.	17.4 % / 20.7 lbs.	26.3 % / 31.2 lbs.	30.9 % / 36.7 lbs.	25.5 % / 30.2 lbs.	17.3 % / 20.5 lbs.
PROXIMAL	31.0 % / 16.8 lbs.	28.2 % / 15.3 lbs.	21.8 % / 11.8 lbs.	19.0 % / 10.3 lbs.	30.9 % / 15.5 lbs.	27.9 % / 14.0 lbs.	22.8 % / 11.5 lbs.	18.2 % / 9.1 lbs.

Figure 3. Comparison of finger flexion strengths of right and left hands.

MEAN, STANDARD DEVIATION AND RANGE OF STRENGTH OF ISOMETRIC FINGER FLEXION STRENGTH
(RIGHT AND LEFT COMBINED. N = 60)

	DISTAL PHALANX			MIDDLE PHALANX			PROXIMAL PHALANX		
FINGER	MEAN	S. D.	RANGE	MEAN	S. D.	RANGE	MEAN	S. D.	RANGE
INDEX	13.9 lbs.	4.0 ±	8.5–25.3	22.6 lbs.	5.2 ±	11.0–35.3	12.0 lbs.	3.8 ±	7.0–22.6
MIDDLE	20.3 lbs.	6.9 ±	11.6–50.0	27.9 lbs.	8.4 ±	12.0–53.0	10.9 lbs.	4.4 ±	7.0–23.0
RING	17.2 lbs.	5.1 ±	7.3–36.0	23.8 lbs.	6.9 ±	6.6–38.6	9.7 lbs.	3.1 ±	4.5–18.0
LITTLE	11.3 lbs.	3.4 ±	5.5–18.6	16.9 lbs.	5.2 ±	3.0–28.6	7.8 lbs.	2.1 ±	3.3–15.6

Figure 4. Isometric flexion strength, showing mean, standard deviation, and range of strength for all hands studied.

muscle strength of each muscle or group (sum of the four fingers) that was exerted by each of the finger segments in the isometric contraction test. This shows that in the test of both the flexor digitorum profundus and flexor digitorum sublimis muscles the middle finger contributed the greatest strength, the ring finger less, followed closely by the index finger, and the little finger contributed the least strength. In the test of the lumbricales and interossei the order of strength from greatest to least was index, middle, ring, and little fingers.

The percentage of total strength exhibited by each of the finger segments is given for the break test also. The results of this test were not considered to be as satisfactory as those of the isometric contraction test. The fact that it was uncomfortable for the subject probably influenced the test scores.

The distribution of muscle strength, according to this test, was the same as that for the isometric contraction test, except for the relationship between the ring and index fingers. The total strength of the ring finger was slightly less than that of the index finger in the position for the flexor digitorum profundus in both hands, and also in the position for the flexor digitorum sublimis in the left hand. As already mentioned, pain on pressure may account for this difference.

The percentage that each muscle group contributed to the total strength of finger flexion (the sum of all joints tested) was practically the same for both tests. The flexor digitorum sublimis was the strongest muscle, contributing 46.9 percent in the isometric test and 47.1 percent in the break test. The flexor digitorum profundus ranked second, contributing 32.3 percent in both tests. The lumbricales and interossei had the least strength, contributing only 20.8 percent in the isometric test and 20.6 percent in the break test.

In comparing the two strength tests, it may be noted that the break test scores were consistently higher than those obtained in the isometric test. The total mean score for the right and left hands shows the break test to be 30.2 percent higher than the isometric test.

The difference in strength between the two hands was very small, the mean difference in total strengths being 2.9 pounds for the isometric test and 6.9 pounds for the break test. Although the mean score shows a difference between the right and left hands, examination of the individual scores shows that the dominant hand was not always the stronger hand. The group selected for the test was one in which the subjects were all engaged in a type of occupation requiring the daily use of both hands with nearly equal strength.

As the isometric contraction test was considered the more satisfactory of the strength test procedures, figures for the mean, standard deviation, and range have been computed only for these data. As no significant difference was found between the right and left hands, these records were combined in the table shown in *Figure 4.** In general, in those tests in which the muscles displayed greater strength, there was a greater standard deviation.

Although the entire dexterity test was given, only the scores for three trials of the right and left hand was used for this study. The coefficient of correlation between the isometric strength test of the left hand and the left-hand portion of the Purdue Pegboard Test was .03 and that between the same tests for the right hand was .05. (MacNemar's modification of the Pierson product moment correlation coefficient was used to obtain all correlations.) A low correlation between strength and dexterity was not unexpected.

*The greatest difference in right and left hand scores was in the distal phalanx of the index finger. Here the "t" value was 2.02, which may be interpreted to mean that there are 4.3 chances in 100 that the observed difference may have been due to chance variation. This is not significant at the 1 percent level.

A grip strength test using the hand dynamometer and technic as described by Rogers for the Physical Fitness Index Test was given each subject. The correlation between strengths obtained in this test and those from the isometric contraction test was .64. Although the hand dynamometer test of the grip strength was not originally planned as part of this study and includes the use of the thumb as well as the fingers, the correlation between the two might be of interest in comparing and evaluating these tests.

No attempt was made to control environmental factors, such as the time of day the tests were given or the amount of rest the subjects had before the tests. Ryan and Agnew* found that these factors may affect strength and endurance. The fact that the break test was uncomfortable for all the fingers may have influenced the results of this test. The values for the ring finger in this test were definitely limited by pain in an appreciable number of cases.

Results of this study, which was limited to thirty adult female subjects, may be summarized as follows:

*A. H. Ryan and J. H. Agnew, "Studies in Muscular Power and Fatigue," *American Journal of Physiology*, XLII (1917), 599.

SUMMARY

1. The middle finger has the greatest total flexor strength and the ring finger is next, the index finger strength is nearly equal to the ring finger, and the little finger has the least total strength. (Although the mean strengths indicate that the ring finger was slightly stronger than the index finger, there were a number of cases in which the reverse was true.)

2. The order of the fingers from most to least flexor strength at the metacarpophalangeal joint is index, middle, ring, and little finger.

3. The flexor digitorum sublimis is the strongest of the finger flexor muscles, the flexor digitorum profundus is next, and the lumbricales and interossei have the least strength.

4. The power of the muscle contraction was consistently greater in the break test than in the isometric contraction test. On the basis of mean total strengths of both hands, the break test yielded scores which were 30.2 percent higher than those of the isometric contraction test.

5. The total strength of the hand as measured in the isometric test had no correlation with dexterity, as determined by the Purdue Pegboard Test used in this study.

Reprints Available

Informational brochures may be obtained without charge. A small charge is made for the scientific reprints, as indicated. (Members of the Association, students enrolled in approved schools of physical therapy, and libraries may have one free copy of each scientific reprint, except the special issues of the *Review* and the Physiology Symposium, but must pay the indicated price for additional copies.) All requests should be addressed to: American Physical Therapy Association, 1790 Broadway, New York 19, N. Y.

PHYSICAL THERAPY—An illustrated brochure, describing the opportunities for a career in physical therapy, with suggestions for prospective students and a list of schools approved for physical therapy training.

OUR ASSOCIATION—An informational booklet on the activities, scope, and services of the American Physical Therapy Association.

SUGGESTIONS FOR PROSPECTIVE STUDENTS—Outlines the professional course of study for college students preparing for physical therapy.

CODE OF ETHICS—Ethics for the physical therapist of the American Physical Therapy Association.

PERSONNEL POLICIES FOR QUALIFIED PHYSICAL THERAPISTS—Suggestions as to salary, hours, vacations, etc., by the American Physical Therapy Association.

APPROVED SCHOOLS OF PHYSICAL THERAPY—A list of schools approved by the Council on Medical Education and Hospitals of the American Medical Association.

QUESTIONS AND ANSWERS—A concise outline describing physical therapy education and application.

EDUCATIONAL OPPORTUNITIES FOR PHYSICAL THERAPISTS—A list of postgraduate programs offered by the approved schools and a list of specialized courses for physical therapists.

UNDERLYING MECHANISMS IN SYMPTOMS OF POLIOMYELITIS: THEIR BEARING UPON TREATMENT—*Thomas Gucker, III, M.D.*

THE PHYSICAL THERAPY DEPARTMENT FROM AN ADMINISTRATOR'S VIEWPOINT—*Joseph P. Peters.*

THE DROP PACK FOR MOIST HEAT—*Adeline E. Doing*

THE ROLE OF THE PHYSICAL THERAPIST IN THE TOTAL CARE OF THE CHILD—*Julius B. Richmond, M.D.*

PLAN AND SPECIFICATIONS FOR ALL-WELDED STEEL TREATMENT POOL

POSTURE TRAINING FOR ADOLESCENTS—*Carolyn Bowen* (5c)

PHYSICAL THERAPY IN THE PRENATAL PROGRAM—*Gillian Griffith Smith, B.S.* (5c)

METHODS OF CLINICAL INSTRUCTION IN PHYSICAL THERAPY—*Beatrice E. Whitcomb, Capt., WMSC* (10c)

FUNCTIONAL TRAINING—*Edith Buchwald* (10c)

ADMINISTRATION OF A COMMUNITY REHABILITATION CENTER—*Hazel E. Furscott* (10c)

WHEEL CHAIRS—*George G. Deaver, M.D.* (5c)

REHABILITATION OF THE HEMIPLEGIC PATIENT—*Donald A Covalt, M.D.* (5c)

PATIENT INSTRUCTION—*Margery L. Wagner* (5c)

PHYSICAL THERAPY HOME CARE PLAN, ORANGE COUNTY (CALIFORNIA) HEALTH DEPARTMENT (5c)

MEASUREMENT OF JOINT MOTION—*Margaret Lee Moore* (15c)

TOYS, GAMES, AND APPARATUS FOR CHILDREN WITH CEREBRAL PALSY—*Gladys G. Rogers and Leah Thomas* (10c)

ROLE OF PHYSICAL THERAPY IN CARE OF PSYCHIATRIC PATIENTS—*Lola E. Smith* (5c)

PHYSICAL THERAPY IN THE HOME—*Arthur L. Watkins, M.D.* (5c)

PHYSICAL THERAPY IN STATE CRIPPLED CHILDREN'S PROGRAMS—*Clara M. Arrington* (5c)

BIBLIOGRAPHY ON NATURAL CHILDBIRTH (10c)

READING REFERENCES FOR ELECTRICAL DIAGNOSIS AND ELECTRICAL STIMULATION (10c)

THE USE OF LEAD-UP FUNCTIONAL EXERCISES TO SUPPLEMENT MAT WORK—*Morton Hoberman, M.D., Erbert F. Cicenia, Hyman L. Dervitz, and Oscar C. Sampson* (10c)

JULY POLIO ISSUE OF THE *Review* (July 1951)—Contains six articles on poliomyelitis by leading physicians and physical therapists. There are thirty-one abstracts from current medical journals. (50c)

SPECIAL FUNCTIONAL ISSUE of the *Review* (November 1949)—Contains eight articles by leading physicians and physical therapists on functional training, crutch walking, and wheel chairs. There are twenty-six abstracts of articles on functional training from current medical journals. (50c)

PHYSIOLOGY OF THE HEART AND CIRCULATION AND ITS CLINICAL APPLICATION IN PHYSICAL MEDICINE—A bound edition of the papers presented in a symposium at the 1950 annual conference of the American Physical Therapy Association. (*Harry D. Bowman, M.D.*, Coordinator) ($1.00)

Editorials

In a recent issue of a national news magazine there appeared an interesting and enlightening article regarding the increase in graduate study during the past few years in this country. The article dealt at some length with the reasons for this increase, as well as the probable effects of the trend, pointing out that advanced education and graduate study could be both profitable and dangerous.

Since it seems probable that our own profession was part of this study, it might be well for us to consider the physical therapy field in light of some of the points of interest mentioned in the article.

For some time now there has been an increasing interest in advanced training in physical therapy. The growth of additional opportunities for masters' degrees, the increase in special courses, and the ever-expanding scope of the field have all contributed to this. Unquestionably, it is a healthy sign that physical therapy is a vital, growing field and as such should be stimulated and encouraged by each of us. As has been said so often, no therapist can ever afford to stop learning, and each of us must recognize the need for and the benefits of properly chosen areas for further education and training.

But it is of equal importance, if the program is to realize its potential benefits, that we maintain an intelligent attitude toward a constructive choice of courses or fields of training. It is unfortunately true that some advanced work is entered upon with too little thoughtful evaluation of the desired objectives. The emphasis, rather than being placed on the usefulness and practical application of the knowledge, is directed toward the attainment of advanced classification. The result, in many cases, is an unfortunate use of time in acquiring facts which will have little or no value in the eventual practice of the student.

We are fortunate, at this time, to have available to our members a wide variety of advanced courses organized to meet the needs of many individuals. Few specialties are not represented, and the basic science fields are well covered. With such an educational potential available, it is urged that careful and serious consideration be given to choosing a field in advanced study possessing useful, practical, and considered objectives. It is a far-reaching responsibility for each member whether he himself is the student, or the advisor to other members, to keep in mind that learning will only be profitable when its objectives can be useful to others.

Announcement

The University of Minnesota announces a continuation course in Physical Medicine and Rehabilitation to be presented for physicians on September 28 to 29, 1951, at the Center for Continuation Study in Minneapolis. The course will stress the role of physical medicine in therapy in general practice. The care of fractures and arthritis will be emphasized. Symposia will be held on "The Care of the Hemiplegic Patient" and "Geriatric Problems."

Marion Smith, Registrar for the American Registry of Physical Therapists, died on Sunday, August 19, 1951, in St. Luke's Hospital, Chicago. She had been ill for the past two months.

Marion Smith, although not a physical therapist, was one in spirit. She had been Registrar since the organization of the Registry and was intimately acquainted with therapists throughout the country. In addition to her duties for physical therapists, she was executive secretary of the Congress of Physical Medicine.

Marion was a loyal, untiring friend of physical therapists. Her working day was never over. Your problems were her problems, and she worked unceasingly for the development of physical medicine. Her patience, understanding, and keen sense of humor endeared her to all who knew her. Her death is a personal loss to us all.

She is survived by her mother, Mrs. Sula Smith of New Brighton, Pennsylvania.

To the Editor:

Noting that only six physical therapists have volunteered in the Women's Medical Specialist Corps for the Korean casualty emergency, I hope that my personal testimony will help those still undecided on this step.

After thirty-one years of active p.t., I am now retired in favor of youth and vim. I find there is no permanent loss, only gain, in service in this corps. At the time of enlistment, in World War II, apparently my home . . . and p.t. practice . . . in the Washington area . . . were sacrificed. Certainly I came back to none of these. But after ten years my Civil Service and other retirement added together make enough to live on simply. I realize I have this which I probably would not have had otherwise, and that I have gained immeasurably in a broader and wiser experience.

Physical therapy is a heavy job physically, but having already chosen it, it is no heavier in the Army than elsewhere, and much is gained, in travel, in education, and experience—opportunities without extra expense, that make it well worth the gamble.

There is no other direct, first-hand way of helping these casualties. Read Marguerite Higgins' "Korea" and realize your opportunity in the Women's Medical Specialist Corps.

MARY LEE CASTLEMAN
Life Member, American Physical Therapy Assn.

Association Activities

1952 Elections

A memorandum has been sent to chapter presidents from the Nominations Committee regarding candidates for nominees for the 1952 Elections. New national officers will be elected in 1952. Your chapter has an obligation as well as an opportunity to participate in selecting candidates for nomination. It is important for the development of the Association that all chapters avail themselves of this privilege. Individual members may also submit suggestions.

Forms for suggesting nominees have been mailed to all chapters. Every member is urged to participate at chapter meetings in selecting candidates for nomination. If you as an individual wish to submit the name of a candidate, please obtain a form from your chapter president.

Distribution of Recruitment and Vocational Guidance Materials

During the twelve-month period from May 1, 1950, to May 1, 1951, a total of 107,204 individual brochures and reprints on physical therapy were distributed by the National Office in the continuing vocational guidance and educational work of the Association. Many of these items were mailed directly to individuals who wrote for information on physical therapy.

Several times that amount were mailed to graduate physical therapists, speakers, schools, and colleges for more meaningful distribution on the local level. The materials covered general information on physical therapy, lists of approved schools, employment opportunities, and suggestions for prospective students.

In the year 1947-48, approximately two thousand people received informational material from the National Office. At that time, one to three items were available to send to the prospective physical therapists.

During the past year more than twenty-one thousand individuals have received similar materials. The envelope which a prospective student received this year contained five to seven individual reprints, leaflets, or brochures, dealing with many aspects of physical therapy as a career.

Your efforts on behalf of educating the public regarding physical therapy and its opportunities as a career, as exemplified by the amount of guid-

ance material distributed, have done much to increase the number of students graduated each year from the approved schools. It is hoped that continued and increased efforts by you and your chapter, through its Education Chairman, will continue to expand this necessary work. Plan your activities early in the fall.

For a detailed list of available guidance and recruitment material, refer to the list of reprints which appears elsewhere in this issue of the *Review*.

Five weeks are required to make an address change for the delivery of the PHYSICAL THERAPY REVIEW. Please notify us in advance if you are moving, giving your old and new addresses. This will insure uninterrupted service in the arrival of your journal.

Summary of the Minutes of the
House of Delegates Meetings
June 17-18, 1951, Glenwood Springs, Colo.

The House of Delegates was attended by representatives from forty-three chapters. Those not present were: Alabama, Santa Barbara, Delaware, Northern Indiana, Maryland, Southern Minnesota, New Hampshire, Rhode Island, South Dakota, Territory of Hawaii, Utah and Vermont. The Speaker, Mary Nesbitt, opened the meeting with greetings from Dr. James B. Mennell and a message from the Canadian Physical Therapy Association expressing regret that they will be unable to hold a joint meeting with the APTA in 1952. The Secretary, Marian Williams, called the roll. Preliminary business included reading and accepting the conference rules; appointment of the following committee to edit the minutes: Marian Williams, Helen Lindau, and R. Lewis Brown; and official acceptance of the conference program.

Annual reports of the President, Secretary, and Treasurer and of the standing committee chairmen were read and accepted. In addition the Treasurer presented a graphic illustration of Association revenues and expenditures. Reports of the National Office activities were given by Margaret Moore, educational consultant; Lucy Blair, polio consultant; Mary Haskell, assistant executive director; and Mildred Elson, executive director. These were followed by a summary of the minutes of the annual Executive Committee meetings held just prior to the conference. These reports are to be published in the *Physical Therapy Review*.

Major Harriet Lee, who had been serving by appointment in the office of Vice-president, was elected by the membership to this office. Edna Blumenthal was elected to the Nominating Committee, replacing Janet Merrill.

The possibility for a national professional liability group insurance plan to cover physical therapists was discussed. It was pointed out that at the present time even hospital administrators sometimes do not realize that physical therapists are not covered under existing policies. Progress made by the National Office in obtaining information regarding such a plan for all members was reported. It was strongly urged that during the coming year, chapters discuss and publicize the importance of this protection.

The bylaws were amended to change the title of "executive secretary" to "executive director."

In response to roll call of chapters present, a delegate from each reported on the year's activities relative to relations, legislation, and civil defense and gave comments and suggestions on effective use of the National Office staff.

A panel discussion on ethics in the physical therapy field was held. Miss Singleton gave a brief introduction, stressing the need for such a discussion. Dorothy Briggs then took up the problem of students who receive scholarships with the understanding that their training period will be followed by a year's supervised experience. The importance of carrying out this agreement should be emphasized to the student by the school. Not only is it a moral obligation, but the advantages of continuing learning of technics and observation of ethical practices past graduation should be firmly implanted. Jean Hjelte discussed procedure in resignation from a job. She stated that many considerations were involved—giving the employer proper notice, orienting the new physical therapist, submitting a resignation in writing, going through

proper channels and discussing the move with the immediate superior, giving reasons for leaving, and expressing regret. A great deal can be done in preparing patients for a change in therapists as well as physicians and fellow workers. Jessie Stevenson discussed relationships of members with unapproved schools (those not eligible for AMA approval). It is contrary to the interests of the profession for members to assist in producing unqualified personnel and to lend their names to such programs. It is also unfair and confusing to students considering schools of this type. Billie Bob Hart commented on the practice of failing to appear for jobs after accepting them and ignoring correspondence regarding employment after making inquiry. Care should be taken in maintaining good professional relationships in fairness to the employers. Virginia Greenwood emphasized the importance of participation in institutional activities, allied professional projects, and the like. The idea that professional responsibility ceases at 5 p.m. does not make for good relations, nor build respect for the physical therapy field. R. Lewis Brown pointed out the responsibility of each member toward participation in chapter programs, serving on executive or standing committees, and emphasized what the member himself gains from these activities. He mentioned also the desirability of student orientation into chapter procedure.

Selection of a site for the 1953 conference involved considerable discussion. Miss Elson explained some of the problems in selection of the conference time and place and stressed the advantage of having the location conform to the area pattern set by the American Medical Association. Dallas was chosen for 1953, rather than Seattle or New York. The Southern California Chapter issued an invitation to hold the 1954 conference in Los Angeles. It was voted to delay action on 1954 until next year.

The following resolution, as presented by Ruth Latimer (Virginia), was adopted:

> *Whereas:* Male physical therapists are eligible for membership in the American Physical Therapy Association, and
>
> *Whereas:* Male physical therapists are rendering valuable service to the profession, and
>
> *Whereas:* A male physical therapist when called into the armed services is unable to practice his profession and the profession has lost one trained person, and
>
> *Whereas:* The male physical therapist is not granted equal status as a physical therapist in the armed services; *therefore,*
>
> *Resolved:* That the House of Delegates of the American Physical Therapy Association in session at the 1951 annual conference, June 18th, at Glenwood Springs, Colorado, go on record as approving and actively supporting Bill H.R.911, as introduced by Representative Bolton of Ohio, and Bill S661, as introduced by Senator Ives of New York.

Miss Elson reported on the status of the bills and correspondence with Mrs. Bolton and Senator Ives.

It was moved that the Executive Committee be instructed to prepare a resolution to the governing body of the American Congress of Physical Medicine that the House of Delegates requests action to provide for a total representation of three registrants who are members of the APTA on the Registry Board of the American Registry of Physical Therapists. The motion was unanimously carried.

—MARIAN WILLIAMS
Secretary

Bound Symposium Available

The Symposium on Physiology (Physiology of the Heart and Circulation and Its Clinical Application in Physical Medicine), which was printed in the November and December issues of the REVIEW, is now available in bound, booklet form. Copies, at $1.00 each, may be ordered from the American Physical Therapy Association, 1790 Broadway, New York 19, N. Y.

The material for this symposium, which was coordinated by Harry D. Bouman, M.D., Professor of Physical Medicine, University of Wisconsin, contains many observations and results from original work which is not available in any other form. The information was selected and presented with the physical therapist in mind, and has been compiled in order to assist the reader to understand better the physiological principles underlying effective patient treatment. The symposium was originally presented at the 1950 conference of the American Physical Therapy Association.

Membership News

Army Promotions

The Department of the Army has announced the recent promotion of the following physical therapists to the temporary grade of Major:

Beatrice Whitcomb, Medical Field Service School, Brooke Army Medical Center, Fort Sam Houston, Tex.
Louise D. Christman, Percy Jones Army Hospital, Battle Creek, Mich.

The following were promoted to the temporary grade of Captain:

Madge Ashton, Army & Navy General Hospital, Hot Springs, Ark.
Jean Barrett, 34th General Hospital, APO 331, c/o Postmaster, San Francisco
Anne M. Callowhill, U. S. Army Hospital, Camp Polk, La.
Dorothy M. Ellison, U. S. Army Hospital, Fort Lee, Va.
Mae A. Engsberg, 97th General Hospital, APO 757, c/o Postmaster, New York
Mary E. Frazee, Valley Forge Army Hospital, Phoenixville, Pa.
Barbara J. Germain, Percy Jones Army Hospital, Battle Creek, Mich.
Dorothy Glidden, Fitzsimons Army Hospital, Denver, Colo.
Alvera Hamlyn, 361st Station Hospital, APO 1055, c/o Postmaster, San Francisco
Willie R. Harvey, U. S. Army Hospital, Camp Rucker, Ala.
Eva M. Hathcock, U. S. Army Hospital, Fort Jackson, S. C.
Clarissa Hicks, 118th Station Hospital, APO 24, c/o Postmaster, San Francisco
Dorothy L. Kemske, 141st General Hospital, APO 660, c/o Postmaster, San Francisco
Gladys Kennedy, 8th Station Hospital, APO 317, c/o Postmaster, San Francisco
Eleanor V. Klett, Fitzsimons Army Hospital, Denver, Colo.
Myrtle J. Lucey, Walter Reed Army Hospital, Washington, D. C.
Marie E. Merrill, Madigan Army Hospital, Tacoma, Wash.
Florence Murley, U. S. Army Hospital, Fort Bragg, N. C.
Cora M. Pedersen, Tripler General Hospital, APO 438, c/o Postmaster, San Francisco
Velma L. Powell, U. S. Army Hospital, Fort Jay, N. Y.
Gertrude Shaffer, 155th Station Hospital, APO 303, c/o Postmaster, San Francisco
Mildred L. Wood, Valley Forge Army Hospital, Phoenixville, Pa.

Joseph Lederman, formerly on the staff at Bellevue Hospital, now with the Physical Medicine and Rehabilitation Service at the Kingsbridge Veterans Hospital, has been made supervisor of that department.

Marriages

Lillian Brown, now Mrs. Lillian B. Ahern, Danielson, Conn.
Joan Wilshire, now Mrs. Joan Marianne Firey, Berkeley, Calif.
Janet Beals, now Mrs. Janet B. Norlin, Cleveland.
Mary E. Madden of West Haverstraw, N. Y., now Mrs. Mary M. Harris, Brattleboro, Vt.
Martha Gayle to J. T. Parks, Jr., Lexington, Ky.
Geraldine E. Finger of St. Paul to Burton Apker, Jr., Chetek, Wisc.
Helene M. Diggin, Dorchester, Mass., now Mrs. Helene D. Driscoll of Chicago.
Lieutenant Jean F. Halpin to M. Ney Waddle, Oakland, Calif., July 7th.
Joan M. Secor of West Haverstraw, N. Y., became Mrs. Joan S. Powell on September 15th.
Joyce Mandell to Joseph Lichtenbaum, Cincinnati.

Paul A. Salisbury, member of the District of Columbia Chapter, died suddenly at his home in Arlington, Virginia, on July 22nd. Mr. Salisbury had been a member of the American Physical Therapy Association since 1947. He is survived by his wife and three children.

Cerebral Palsy Courses

The Coordinating Council for Cerebral Palsy in New York City, Inc., will again sponsor a two-week Cerebral Palsy Institute, to be given from *January 21 through February 1, 1952*. Tuition for the course will be $25. Qualified physicians; physical, occupational, and speech therapists; nurses; social service, rehabilitation, and guidance workers; teachers; and psychologists are eligible. The Institute will include seminars, field trips, clinical demonstrations, and lectures.

Following the Institute, and starting on *February 4, 1952*, the Coordinating Council for Cerebral Palsy in New York City, Inc., in cooperation with the College of Physicians and Surgeons, Columbia University, will offer a three-month postgraduate cerebral palsy course for qualified physicians and occupational and physical therapists.

Didactic lectures on the medical and socio-psychological aspects, together with multi-professional seminars, will be given once a week. Four full days a week will be spent, on a rotating internship basis, in the various diagnostic and treatment clinics in and about Greater New York.

General News

AMA Resolution on Curative Workshops Approved

The following resolution was adopted by the House of Delegates of the American Medical Association at their meeting in Atlantic City in June 1951.

RESOLUTION OF MEDICAL SUPERVISION OF CURATIVE WORKSHOPS

Dr. Frank H. Krusen, Section on Physical Medicine and Rehabilitation, presented the following resolution, which was referred to the Reference Committee on Miscellaneous Business:

Whereas, Certain high-minded citizens have organized in various communities throughout the United States certain institutions known variously as curative workshops, institutes of rehabilitation, or rehabilitation centers in which both physical therapy and occupational therapy are employed in the treatment of sick and disabled persons; and

Whereas, Such curative workshops, institutes of rehabilitation, or rehabilitation centers have in a number of instances failed to provide adequate direct medical supervision of the lay therapists who provide the physical therapy and occupational therapy; and

Whereas, Certain state medical societies have requested an explanation of the point of view of the American Medical Association concerning adequate medical supervision of such organizations; and

Whereas, The Council on Physical Medicine and Rehabilitation of the American Medical Association has expressed the opinion that all facilities which provide services in physical therapy and occupational therapy should be under the direct supervision of a properly qualified and duly licensed physician; therefore be it

Resolved, That the House of Delegates of the American Medical Association go on record as recommending that all curative workshops, institutes of rehabilitation, rehabilitation centers, and other organizations of a similar nature which provide services in physical therapy and occupational therapy shall conduct such medical treatment under the direct supervision of a properly qualified and licensed physician.

Colonel Perry Promoted

For the first time in its history, the United States Air Force now has three female full colonels, the highest rank yet attained by a woman officer in the Air Force. One of these three women is Colonel Miriam E. Perry of USAF Medical Service.

Colonel Perry has been advanced from Acting Chief to Chief of the Air Force Women's Medical Specialist Corps.

Rehabilitation Film Available

The Physical Medicine Department of the Georgia Warm Springs Foundation now has available a 2,000-foot, 16-millimeter, sound and color film entitled "Improving the Functional Capacity of Severely Involved Upper Extremities." This film, of 57-minute duration, deals with the adaptive apparatus and specific functional training technics used for poliomyelitis patients with severe involvement of the upper extremities. All requests should indicate the specific date desired for the use of the film, and may be addressed to: Physical Medicine Department, Georgia Warm Springs Foundation, Warm Springs, Georgia, Attention: Mrs. Hazel R. Stephens.

Nicholas S. Ransohoff, M.D., of Long Branch, N. J., died at his home in that city on April 25th after a prolonged illness.

For many years Dr. Ransohoff had lived in Long Branch and maintained an office there. He was on the staffs of the Children's County Home, the Betty Bacharach Home for Crippled Children at Atlantic City, the Riverside Hospital at Red Bank, and the Paul Kimball Hospital at Lakewood. Dr. Ransohoff was a fellow of the American Orthopedic Association, a diplomate of the American Board of Orthopedic Surgery, and a member of the American Academy of Orthopedic Surgery and the New York Academy of Medicine. He was the pioneer in the treatment of poliomyelitis by curare.

Dr. Ransohoff is survived by his widow, the former Priscilla Burnett.

Army Announces New Physical Therapy Program

The Physical Therapy Clinical Practice Program, designed to alleviate the critical shortage of physical therapists in Army hospitals, has just been announced by the Surgeon General of the Army. This program is the result of a recommendation made by Miss Mildred Elson, physical therapy consultant, following a conference in the spring of 1951 on procurement problems. It has the approval of the American Physical Therapy Association and the Council on Medical Education and Hospitals of the American Medical Association.

Clinical practice will be provided in Army hospitals for qualified young women who have completed the didactic requirements of an approved civilian physical therapy course. Those who desire to take advantage of this program will find an excellent opportunity for professional growth while at the same time rendering a service to their country. Students selected to participate in this training will be commissioned as second lieutenants in the Women's Medical Specialist Corps Reserve. They must agree to volunteer for a two-year tour of active duty which will include the time spent in clinical practice and a one-month period of orientation to military customs and procedures.

Additional information may be obtained by writing to The Surgeon General, Department of the Army, Attention: Chief, Women's Medical Specialist Corps, Washington 25, D. C.

New Film Stars Paraplegic

The Kessler Institute for Rehabilitation has announced the release of its second 16 mm. sound-color documentary film depicting the rehabilitation program of the institute. This new film, running time: 17 minutes, is entitled *The Story of Lucy* and portrays the ten-month rehabilitation program of a twenty-five-year-old paraplegic woman and her return to full employment.

The Story of Lucy is not released as a technical film on rehabilitation technics, but rather as an educational film describing the problems of paraplegic women and how they are solved through the cooperative approach of the rehabilitation center program and community resources. The film was planned to be of interest and educational value to both professional and lay groups, and is available from the Kessler Institute at a nominal rental fee. Persons interested in borrowing the film may communicate with Mr. William K. Page, Administrator, Kessler Institute for Rehabilitation, Pleasant Valley Way, West Orange, N. J.

Air Force Needs Women Medical Specialists

An urgent call for 320 Women's Medical Specialists—145 dietitians, 60 occupational therapists, and 115 physical therapists—by July 1952 has been made by Colonel Miriam Perry, Chief, USAF, Women's Medical Specialist Corps.

"Qualified WMSC officers are our most critical shortage," says Major General Harry G. Armstrong, Surgeon General, USAF. "They are difficult to find. Though small, the WMSC is one of the most vital groups in the USAF Medical Service Corps. They contribute immeasurably to the health and well-being of America's airmen by reason of their special skills and technical knowledge."

Both Regular and Reserve commissions are open to qualified individuals. Applicants will be accepted with the rank of Second Lieutenant or better, USAF (WMSC) Reserve, depending on their length of experience in the specialist field they apply for. Once on active duty as Reserve Officers, persons interested in a permanent career may apply for Regular commissions.

Candidates for Physical Therapist must have a bachelor's degree, with major emphasis in physical education or the biological sciences, and have graduated from a training course in physical therapy approved by The Surgeon General, USAF. Applicants for Reserve commissions (only) need to have completed three years' college (90 semester hours), plus the approved physical therapy training course.

Applicants for a Regular commission must be single, between 21 and 28 years of age, have no dependents under 18, and have served six months of active duty as an Air Force Reserve Officer immediately prior to application.

Requirements for a Reserve commission are the same as for Regular, with the educational qualifications listed above, but applicants may be between 21 and 45 years of age.

All newly-commissioned officers entering on extended active duty are usually assigned first to Air Force medical installations where they receive an indoctrination training course in Air Force customs, procedures, and technics. Later assignments lead to duty as staff members in military hospitals on a rotating and progressional pattern.

Colonel Perry pointed out the numerous benefits which WMSC's receive: free $10,000 life insurance policy; free medical and dental care; hospitalization; annual leave; considerable travel; retirement privileges; not to mention numerous opportunities for postgraduate education, which may lead to a master's degree. Colonel Perry cited

the monetary advantages by pointing out that a Second Lieutenant upon appointment receives a $250 cash uniform allowance; base pay of $213.75 monthly; ration allowance of $42.00; and rental allowance of $60.00 without dependents (if quarters are not available on the base) and $75 with dependents. There are periodic pay increases and opportunities for promotion after specified periods of service.

From the travel and experience angle, WMSC's are rotated among various Air Force installations here and abroad. WMSC's are now assigned to Air Force Hospitals throughout the United States. In addition, they are assigned to large hospitals abroad, in England, Europe, Japan, North Africa, Puerto Rico, Alaska, and the Philippines.

Parents' Study Guide Published

How parents of cerebral palsied children can effectively come together to exchange experiences, secure information, and participate in developing services for cerebral palsied children is outlined in the new 76-page "Parents' Study Guide," published by the National Society for Crippled Children and Adults, Chicago.

Composed of five sections, the first section is entitled "Needs of Parents of Cerebral Palsied Children," and outlines aims and organization of a parent group. Planning a program for parent study presents suggestions for leadership and parent participation in the group.

The Program Study Outlines for nineteen meetings cover specific phases of treatment, training, education, counseling, and other areas of interest with accompanying lesson outlines and source materials. The role of parents as members of the cerebral palsy team, and projects they can assist, are listed in Section IV.

The final section is the Parents' Book Shelf, a bibliography of pamphlets, magazines, and books for parents of handicapped children and a listing of organizations which publish and distribute literature for child care and guidance and family living.

Authorities who have reviewed the Study Guide have called it an important tool for working with parent groups. Because part of the publishing costs were defrayed through a grant from the CIO International Union of United Brewery, Flour, Cereal, Soft Drink, and Distillery Workers of America, special prices on the booklet are being offered. For one to twenty-five copies, the cost is 50 cents each; twenty-six to one hundred copies, 45 cents each; and more than one hundred copies, 40 cents each.

Jobs for Handicapped

A special task force has been appointed by Mobilization Director Charles E. Wilson, charged with the responsibility of stepping up training, placement, and utilization of physically handicapped persons in defense work. Chairman is Dr. Theodore G. Klumpp of New York, president of Winthrop-Stearns pharmaceutical house. Other physician members are Drs. Daniel Blain, Medical Director, American Psychiatric Association; George G. Deaver, NYU-Bellevue Medical Center; Harold Von Achen, medical director of Caterpillar Tractor; and Charles S. Wise, Washington physiatrist. Also on the task force are Dr. Carroll L. Shartle, professor of psychology at Ohio State University; Henry Viscardi, Jr., and Dorothy C. Stratton of New York; Frank L. Fernbach, Washington labor leader; Davis E. Geiger, Ashland, Kentucky, president-elect of the National Society for Crippled Children and Adults; and Col. E. W. Palmer, Kingsport, Tennessee, publisher. "The task force," said Wilson's announcement, "will survey existing services and practices and recommend steps which should be taken to facilitate the evaluation, training, and placement of the handicapped at the community level." Instrumental in the establishment of the group were Dr. Howard A. Rusk, Wilson's chief medical advisor, and Mary E. Switzer, director of the Office of Vocational Rehabilitation.

Army Offers 12-Month Tour of Duty

The Women's Medical Specialist Corps has a continuing need for physical therapists to meet the needs of the expanding Army. Young women who have recently graduated from an approved school should consider joining the Army Medical Service Reserve. The Army offers many unusual opportunities for a career and for professional advancement.

Application for active duty may be made concurrent with application for commission. To enlist now will not only afford unusual professional experience because of the variety of war injuries, but will be a definite contribution to the defense effort and to the men who are fighting for our country.

Women officers enjoy the same pay, allowances, and privileges as male officers of equal rank and have the same retirement rights. The minimum tour of active duty is now twelve months, instead of the twenty-one months previously required. This period may be extended one, two, or three years if desired.

New Handbook on Vocational Trends Released

America's mobilization efforts have changed employment prospects for nearly every type of job in the country, whether related to defense or not.

In most fields, the number of workers needed has increased, but in some the mobilization impact has had a reverse effect.

These facts run through a new 575-page edition of the Occupational Outlook Handbook, released jointly by Secretary of Labor Maurice J. Tobin and Administrator of Veterans' Affairs Carl R. Gray, Jr. It was prepared by the U. S. Department of Labor's Bureau of Labor Statistics, in cooperation with the Veterans Administration.

The Handbook, which contains complete reports on 433 occupations by which Americans earn their living, will be used by the Veterans Administration in counseling disabled veterans planning vocational training. It also has been adopted for official use by all other Federal agencies providing counseling services. High schools, colleges, and community guidance services are expected to use it widely.

Copies are available to the public, at $3.00 each, from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

The illustrated volume demonstrates how the nation's defense activities almost overnight have changed the future prospects of occupations ranging from college professors to foundry workers and from farmers to insurance salesmen.

Before the outbreak of the Korean conflict, for example, the employment outlook for young engineers was not bright, since colleges were turning out record numbers of graduates faster than business and industry expected to be able to absorb them. But today, the Handbook points out, the picture has reversed: more jobs than takers.

The Handbook also discusses prospects for a number of other professions, as they have been affected by America's mobilization activities. Following are highlights:

For teachers, the Handbook states, the outlook for the future depends largely upon the type of teaching to be done. New openings for college instructors will be limited mainly to replacements for those who retire or leave the profession for other reasons. At the high school level, the defense program apparently is draining off the surplus of teachers that existed before Korea, creating more opportunities for newcomers, but there is still an oversupply in some subject fields. And at the grade school level, the shortage that has existed for some time back has now become more severe than ever.

Medicine, dentistry, nursing, and other health service occupations continue to offer excellent opportunities for those able to gain admission to professional schools. One reason is the armed forces' need for more medical personnel. Other reasons, according to the Handbook, are America's increasing and aging population, rising income level, growth of preventive medicine, and progress in medical science itself.

Law is one of the few professions that probably will continue to remain overcrowded, despite the defense program, the Handbook notes. Mobilization may reduce competition for jobs, but certainly won't eliminate it entirely. The Handbook points out that 12,000 young lawyers passed their bar examinations in 1949 alone—almost twice as many as in any of the immediate pre-war years. And the number of new graduates probably will remain high for the next year or so, unless many students are suddenly called into active military duty.

Other professions which, the Handbook states, will offer bright prospects for the future include social work, library work, accountancy (overcrowded before Korea), and psychology. But despite the defense program, the fields of newspaper reporting, radio announcing, and photography will remain relatively difficult to enter.

Turning to fields other than the professions, the Handbook evaluates the building trades, and finds that the impact of defense on the employment outlook has been mixed.

In some of the trades any reduced employment brought about by lessened civilian construction probably will be more than made up by booming defense requirements. But other trades, not readily adaptable to defense needs, will be hard hit.

The Handbook lists plumbing, pipe fitting, and construction machine operating among the construction trades with promising outlooks even during mobilization. On the other side of the ledger, trades which may suffer if home building is cut include stone-masonry, cement finishing, plastering, painting, and paperhanging.

America's fast-growing "machine age" has largely been responsible for the excellent employment prospects of the thousands of craftsmen and repairmen who build the machines and keep them running. As more and more mechanical equipment is developed—ranging from household gadgets to tremendous machines for industrial use

—the need for new employees skilled in their operation and repair will increase apace, according to the Handbook.

An example, it predicts that employment of automobile mechanics will remain at current high levels, regardless of whether or not new car production is curtailed. The reason, it explains, is that there are now 45,000,000 automobiles on the road, half of which are pre-World War II vintage, and all of which sooner or later will need repair.

Or, as another example, the Handbook sees a bright future for skilled radio and television technicians. The demand for electronic technicians will be strong both to service home radio and television sets and to manufacture and service military and industrial electronics equipment.

The job outlook for foundry workers has been given a lift by the defense program, the Occupational Outlook Handbook observes. Job openings will be particularly numerous during the early fifties, as metalworking industries—principal users of castings—expand to meet defense requirements.

In a section on employment prospects in transportation, the book predicts a long-range decrease in the number of workers employed by railroads, and a gradual increase in those hired by the airlines.

The drop in railroad employment, however, may be arrested temporarily as the stepped-up defense program creates heavy demands for rail traffic. But eventually the decline will continue, since the trend is to employ fewer workers to handle a given volume of traffic.

Air transportation, the Handbook notes, has had its ups and downs after World War II—overexpansion, a sharp shakedown in employment and a leveling off—but in the long run, steady growth is likely. Employment began to pick up even before Korea, and has accelerated since.

The Handbook's section on insurance indicates that it's easy to find jobs as insurance salesmen and brokers—but difficult to keep them, since competition is keen, and long-established agents have a natural advantage over newcomers in making sales.

The Occupational Outlook Handbook covers the field of agriculture, describing opportunities in each of the ten major regions of the United States. This section was prepared by the Bureau of Agricultural Economics of the U. S. Department of Agriculture.

Farming, the Handbook states, offers "excellent opportunity" for vigorous, intelligent operators, not afraid of hard work.

At the present time, it explains, the reserve labor force on farms is relatively small, in contrast to the prewar period. Thousands of men are needed each year, to replace the aged, the physically disabled (farm accident rates are high), and the economic casualties of bad financing or inefficient operation.

In describing each of the many occupations covered, the Occupational Outlook Handbook does not limit itself to future prospects alone. Also included are descriptions of the job itself, information on training and required qualifications, earnings, and working conditions. Several sections of the book have been devoted to important defense industries, such as aircraft, ship building, steel, and oil.

The book was prepared with the help of thousands of trade associations, unions, private employers, and other groups, as well as a number of government agencies other than the Bureau of Labor Statistics.

Recruitment Poster

This very attractive blue-and-gold poster is now available for distribution. The size is 8 x 10 inches, suitable for bulletin boards. Supplies will be mailed to chapters, and to members on request. Let's get it up in schools, libraries, Y.W.C.A.'s, and as many other places as possible.

Index to Current Literature

Anterior Poliomyelitis

Polio Precautions, 1951. Illinois Health Messenger, State Department of Public Health, June 1, 1951.

Poliomyelitis, Hospital Inquiry, England and Wales, 1949. W. H. Bradley and A. H. Gale. Public Health Reports, U. S. Public Health Service, June 8, 1951.

Is the Public Health Law Responsible for the Poliomyelitis Mystery? R. R. Scobey. Archives of Pediatrics, May 1951.

Poliomyelitis Occurring after Antigen Injections. Gaylord W. Anderson, and Audrey E. Skaar. Pediatrics, June 1951.

Administrative Problems in a Polio Unit. Sister M. Asumpta. Hospital Progress, June 1951.

The Precipitation of Clinical Poliomyelitis by Injections. L. S. Goerke. California Medicine, May 1951.

Cerebral Palsy

A Study of the Association of Factors of Pregnancy and Parturition with the Development of Cerebral Palsy: A Preliminary Report. A. M. Lilienfeld and Elizabeth Parkhurst. American Journal of Hygiene, May 1951.

Organization of a Clinic for Care and Treatment of Children with Cerebral Palsy. David McL. Greeley. Archives of Physical Medicine, July 1951.

Exercise

Effect of Exercise and Emotional Stress on Renal Hemodynamics, Water and Sodium Excretion in the Dog. William D. Blake. American Journal of Physiology, April 1, 1951.

Respiratory Regulation During Exercise in Unconditioned Subjects. J. B. Hickam, W. W. Pryor, E. B. Page, and R. J. Atwell. Journal of Clinical Investigation, May 1951.

ractures

Vascular Complications in Fractures and Traumatology. Donald S. Miller and Leo Markin. Industrial Medicine and Surgery, July 1951.

Fractures of the Elbow in Children. Walter P. Blount, Irwin Schulz, and Robert H. Cassidy. Journal of the American Medical Association, June 23, 1951.

Geriatrics

The Biology of Ageing. Edward A. Bortz, M.D., Delaware State Medical Journal, May 1951.

The Care of the Aged in a State Mental Hospital. F. D. Nace, R.N. American Journal of Nursing, June 1951.

Miscellaneous

"Growing Pains": A Clinical Study of Nonarthritic Limb Pains in Children. John M. Naish and John Apley. Archives of Diseases in Children, April 1951.

Treatment of Acne. Leon Goldman. Postgraduate Medicine, June 1951.

Rheumatoid Spondylitis. S. K. Conner. Arizona Medicine, June 1951.

Physiological Responses of Men to Chilling in Ice Water and to Slow and Fast Rewarming. A. R. Behnke and C. P. Yaglou. Journal of Applied Physiology, April 1951.

Tendinitis and Subacromial Bursitis. K. Armand Fischer and Kenton D. Leatherman. The Journal of the Kentucky State Medical Association, July 1951.

Peripheral Vascular Diseases

Diagnosis and Treatment of Chronic Occlusive Disease of the Peripheral Arteries. Nelson W. Barker. The Journal Lancet, February 1951.

"Priscol" in the Treatment of Peripheral Vascular Diseases. J. F. Goodwin and Samuel Kaplan. British Medical Journal, May 19, 1951.

The Blood Flow to the Lower Limbs in Peripheral Arterial Disease and Coarctation of the Aorta. G. M. Wilson. Edinburgh Medical Journal, March 1951.

Posture

Posture and the Nurse. Sonya Weber. Public Health Nursing, June 1951.

Flexion Treatment of Low Back Pain. William L. Waldrop and Howard B. Shorbe. Journal of the Oklahoma State Medical Association, April 1951.

The Painful Back. A. W. Bagnall. Canadian Medical Association Journal, February 1951.

Rehabilitation

Rorschach Patterns Predicting Success or Failure in the Rehabilitation of the Physically Handicapped. Joseph Levi. Journal of Abnormal and Social Psychology, April 1951.

Mother-Child Relationships in Rehabilitation of the Physically Disabled. A. M. Powers, Morris Grayson, and Joseph Levi. Social Case-work, June 1951.

Rehabilitation Provides Approach to Normal Living for Amputees: A Symposium. Part I: Mental Adjustment, Physical Restoration, Preparation for Prosthetic Appliance, and Crutch Walking. Hospital Progress, April 1951. Part II: Role of Medical Social Worker, Prostheses for Major Amputees, Teaching Amputees Stump Hygiene. Hospital Progress, June 1951.

Physical Medicine and Rehabilitation for Patients with Hemiplegia. L. R. Burnham. Journal of the Maine Medical Association, June 1951.

A Useful Measurement Tool in the Physical Rehabilitation Program of Preschool Orthopedically Handicapped Children. Morton Hoberman, Erbert F. Cicenia, and George R. Stephenson. Archives of Physical Medicine, July 1951.

Ultraviolet Radiation

Delayed Effects of Ultraviolet Burns in Man. M. L. Thomson. The Lancet, June 23, 1951.

Cause of Changes in Sweating Rate after Ultraviolet Radiation. M. L. Thomson. Journal of Physiology, January 30, 1951; abstracted in the Journal of the American Medical Association, June 16, 1951.

Dyshidrosis Produced by General and Regional Ultraviolet Radiation in Man. M. L. Thomson. Journal of Physiology, January 30, 1951; abstracted in the Journal of the American Medical Association, June 16, 1951.

Abstracts

Experimental and Clinical Investigations of Peripheral Nerve Injuries of the Upper Extremities

George Perret, M.D., Ph.D., Iowa City. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 146:6:556, June 9, 1951.

Early recognition of a peripheral nerve injury is the greatest single prophylactic measure that can be taken to insure a good result after surgical repair of an interruption in the continuity of a nerve trunk. Lesions of the median, ulnar, and radial nerves are the commonest of the injuries to the peripheral nerves in the upper extremities, and to these injuries must be added injuries of the brachial plexus. In general, it must only be kept in mind that an injury to a peripheral nerve produces the characteristic sign of a lower motor neuron lesion: that is, a flaccid paralysis, a loss of deep tendon reflexes and of sensation in all modalities, atrophy of muscles, and a reaction of degeneration on electrical stimulation.

The contribution of Pollock and his associates—the question of electrodiagnosis in peripheral nerve injuries applied to the study of recovery before and after surgical repair—cannot be overemphasized, as the electrical signs of recovery antedate the recovery of motion and sensation by many weeks.

The most important principle that affects the results of peripheral nerve surgery, and is not sufficiently emphasized, is that principle which stresses every effort to keep the effector mechanism in a state in which it may function. It is of little avail to have a perfect microscopic regeneration of a peripheral nerve trunk if the muscles are so atrophied and fibrosed and the joints so fibrosed and ankylosed that they will not move. Such a peripheral nerve suture may be classified as a failure and yet regeneration within the nerve trunk may be perfect. Consequently, the intensive use of physical therapy, and all of its adjuncts—electrical stimulation, massage, active and passive movements, and use of proper splinting of the paralyzed extremity or portion of the extremity into a position of relaxation of the paralyzed muscle and of function of the limb—is of great importance and cannot be overemphasized. Yet it is one of the factors in peripheral nerve surgery that is most often neglected.

Visual and Motor Changes in Patients with Multiple Sclerosis: A Result of Induced Changes in Environmental Temperature

Thomas C. Guthrie, M.D., New York. In ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 65:4:437, April 1951.

Climate and temperature have been recognized as affecting the incidence of multiple sclerosis. Although sex and race appear not to be important factors in its occurrence, the geographical distribution seems to vary significantly with the distance of an area from the equator. According to one study of the mortality statistics in fourteen countries, there is "an inverse and rather striking relationship between reported mortality due to multiple sclerosis and mean annual temperature. The colder the climate, the higher the crude death rates for multiple sclerosis." A definite statistical relationship of multiple sclerosis to seasonal variations in temperature does not seem to exist.

In the past, in an attempt by physicians to discover effective therapeutic approaches to multiple sclerosis, patients have been subjected to various forms of heating. On the rationale that the disease may be caused by a virus and that a heat-sensitive organism may be found in the spinal fluid, twelve patients were subjected to immersion in a hot bath at 110 degrees F. for ten minutes. After 115 baths were given to the twelve patients, the condition of four showed improvement; that of six showed no change; and that of two became worse. In a general discussion of therapy with hot baths to patients with multiple sclerosis, the observation was made that "muscle weakness ordinarily was not favorably influenced."

Several attempts have been made to treat multiple sclerosis with electropyrexia. With local diathermy, given over the spinal cord, to thirteen patients, ten showed improvement; one relapsed and was then cured; one became worse; and one had questionable results. The criteria for improvement are vague, and no control series is reported. In general reference to electropyrexia, the comment has been made that fever may bring out latent neurological abnormalities.

In general, while hot baths, diathermy, fever cabinets, and pyrexia induced with foreign protein have been tried several times in the treatment of multiple sclerosis, inconclusive results have gradually led to their disrepute as effective agents.

Of the changes that seem to appear during heating, the generalized weakness, arm weakness, leg weakness, and dysarthria have, in general but not always, been present in the patients with multiple sclerosis before heating. The effect of the hot baths seems mainly to have been one of rendering these dysfunctions more evident.

Rehabilitation from Pediatrics to Geriatrics: Disgraceful Lack of Rehabilitation Facilities Alleged

Albert A. Martucci, M.D. Editorial in THE PENNSYLVANIA MEDICAL JOURNAL, 54:3:237, March 1951.

The purpose of a survey made by the Commission on Physical Medicine and Rehabilitation of the Medical Society of the State of Pennsylvania was to discover what services and facilities are at present available for the rehabilitation of the people of the Commonwealth of Pennsylvania.

The results shown by the hospitals that responded to the questionnaires demonstrated a woeful lack of rehabilitation facilities either on an outpatient basis or as an in-patient service. It has been estimated from the survey that less than one half of one percent of the hospital beds in the Commonwealth of Pennsylvania are devoted to any type of rehabilitation, and a conservative estimate is made that there are ten thousand persons in the state needing such services.

If we are to meet the problem of rehabilitation from pediatrics to geriatrics, it is necessary that 10 percent of the present hospital beds be made available immediately for rehabilitation. It has been proved by the Army and Navy hospitals and the veterans hospitals that miraculous results could be obtained by a rehabilitation program. Getting these patients back into society and enabling them to assume the best economic position possible in their community is a "must" in view of present-day emergencies. It has been proved that patients so rehabilitated become self-sustaining, independent, and contribute to the welfare of society as a whole rather than become burdens.

Treatment of Rheumatoid Arthritis: An Appraisal of Some Currently Used Methods

Edward W. Boland, M.D., Los Angeles. In AMERICAN PRACTITIONER, 2:7:577, July 1951.

Most chronic diseases serve as trying therapeutic problems, but probably none has been more challenging than rheumatoid arthritis. Because the clinical pattern of the disease is variable and often unpredictable, and because response to treatment with measures used in the past has been slow, appraisal of newly recommended agents has been difficult. With an unknown pathogenesis and without the advantage of employing experimental animals to evaluate therapy, treatment has been almost entirely empirical. For no other disease have so many remedies been proposed, and although often heralded by extravagant claims, most have proved eventually to be of limited or no value. However, the proper selection of certain time-tested measures has made it possible to afford varying degrees of comfort and often to prevent crippling—indeed, not infrequently therapeutic effort has been rewarded by partial or complete arrest of the disease.

One of the measures designed to alleviate discomfort and to prevent deformities is physical therapy. Proper home physical therapy measures with the use of relatively simple apparatus (radiant heat, contrast baths, hot packs, paraffin baths, hot tub baths, sponge rubber finger exercises, quadriceps drill exercises, muscle massage, rotary and abduction exercises for the shoulders, etc.) are of distinct value. These can be taught to the patient and/or members of his family easily, and can be carried out once or twice daily; they may be supplemented advantageously by professional physical therapy two to three times a week when necessary.

Simple plaster splints, worn at night and intermittently during the day, may be of value in preventing deformities and should be employed early, while medical measures are being instituted. One must, however, guard against prolonged splinting, as such may promote stiffness of the joints and atrophy of the muscles. Even during acutely painful stages plaster molds must be removed daily and passive motion allowed.

In the treatment of rheumatoid spondylitis, the prevention of postural deformity constitutes a special problem. The patient should be taught how to assume the proper stance at all times with the lower abdominal muscles pulled in, the thorax raised, the shoulders squared, and the head held erect. In addition, he should be taught trunk stretching exercises, hamstring and calf-stretching exercises, deep breathing exercises, and exercises for the correction of special postural defects. He should perform these exercises twice daily at home. Analgesics such as aspirin, taken beforehand, will often allow the patient to carry them out more enthusiastically, and a hot tub bath beforehand also will help. The patient should be instructed in the use of a firm bed without pillows and a blanket roll beneath the thoracic spine for spinal hypertension. In most instances, if proper exercises are begun early, orthopedic braces are not necessary at later stages.

The Prevention of Thromboembolism

Leo Loewe, M.D., Louis Berger, M.D., and Richard P. Lasser, M.D. In ANGIOLOGY, 2:1:26, February 1951.

This communication is intended to discuss the problems of thromboembolic diseases in general; to review, critically, the various measures now employed in dealing with the disease and to recount our experience with a comprehensive prophylactic program. This will serve to emphasize the importance of a prophylactic approach, rather than a purely therapeutic one, and will demonstrate that a large scale prophylactic effort is both fruitful and feasible.

Several nonspecific measures in the prevention of venous thromboembolic disease are employed, generally, in surgical patients. One of these is early ambulation. This means not merely dangling but actually getting the patient out of bed. The heels, only, are to be supported by a soft foot stool. The calves should not be in contact with anything; in other words, there should be an avoidance of pressure on the calf veins. Patients should actually be ambulated on the day of operation and preferably immediately or as soon after the operation as possible. This can be done with but few exceptions. It is an erroneous idea that patients who are merely gotten out of bed and permitted to sit for an undetermined period of time are ambulated. This, in point of fact, is worse than permitting the patient to be in bed throughout. Early ambulation is associated with a reduction in the incidence of thromboembolic disease from 33 to 18 percent, and especially is the incidence of pulmonary embolism reduced. These statistics may be, of course, somewhat overenthusiastic in that many of the reported series do not take into consideration the delayed type of thromboembolic disease which makes its appearance after the patient's discharge from the hospital. We know of instances of this type, and are convinced that others have encountered the same. While early ambulation alone does not solve the problem in its entirety, the fact nevertheless remains that both the morbidity and the mortality are decidedly reduced.

Elevation of the legs and leg exercises are helpful, but the beneficial effects are not too significant. Exercises in bed are nevertheless recommended.

Avoidance of compression of calf veins, especially in elderly subjects, is an important detail. This applies to the procedures in the operating room as well as postoperatively.

In patients with varicose veins, elastic stockings and other pressure dressings are of some value. However, severe compression of varicose veins in elderly subjects is contraindicated.

Such general measures can be carried out regularly except in the aged, the desperately ill, those with advanced malignancy, and the bed-fast.

Reflexes Evoked by Cold Stimuli in Injuries of the Spinal Cord

Lewis J. Pollock, M.D., Benjamin Boshes, M.D., Herman Chor, M.D., Isidore Finkelman, M.D., Alex J. Arieff, M.D., Meyer Brown, M.D., and John R. Finkle, M.D., Chicago. In ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 65:5:622, May 1951.

Intrigued by the challenge of an article by Macht and Kuhn, in which it is pointed out that there is a paucity of information on the reflexes evoked by cold stimuli in spinal man. Pollock and coauthors studied such responses of injuries to the spinal cord in their material.

As was expected, the stimulus of cold, as in the case of other exteroceptive stimuli, produced reflex activity from the distal end of an injured spinal cord.

The effectiveness of the stimulus was less than that of scratch or of multiple pinprick. The responses occurred from stimulation of similar reflexogenous zones.

As was the case with other stimuli, the greatest number of muscle groups participating in the reflexes occurred with injury to the cervical portion

of the spinal cord; next, with injury of the thoracic portion; and least, with injury of the lumbar portion. The greatest number of cases in which no response followed stimulation was that of injuries to the lumbar portion of the spinal cord; next, that of injuries to the thoracic portion; and least, that of injuries of the cervical portion. The frequency of crossed reflexes was least with lesions of the lumbar portion of the spinal cord, next with lesions of the thoracic region, and greatest with lesions of the cervical region. Ipsilateral reflexes alone predominated.

With lesions of the cervical portion of the spinal cord, abnormal reflex activity in the upper extremities occurred from stimulation of the skin of the upper extremities. The arm and forearm were more effective reflexogenous zones than the hand, and the volar surfaces were more effective than the dorsal surfaces. The arm and forearm were the most effective zones for reflex movements of the shoulder, forearm, and wrist; and the hand was the most effective for movements of the thumb and fingers. Ipsilateral and contralateral reflexes of the upper extremities were evoked from stimuli below the level of the lesion, in a few cases as low as the inner aspect of the thigh. Stimulation of the upper extremity resulted in reflex movements of the lower extremities in two instances, representing 5 percent of 43 cases; whereas stimulation of the abdominal wall resulted in such reflex activity in 18 instances, representing 41 percent of 43 cases of lesions of the cervical portion of the cord. More reflex activity resulted from stimulation of the upper than of the lower abdominal quadrants.

An Assessment of Therapy in Parkinson's Disease

Robert S. Schwab, M.D., Boston, and John S. Prichard, M.B., M.R.C.P., London. In ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 65:4:489, April 1951.

Since 1817, when James Parkinson recognized the entity of paralysis agitans among the heterogeneous collection of tremors and paralyses, the most persistent attempts have been made to treat this disease. Charcot thought some of his patients were benefited by riding on horseback. Consequently, he had constructed a *fauteuil trepidant*, on which he made his patients sit and shake for stated periods. A pupil of his, Gloreux, was so impressed with this idea that he prescribed for his patients a two-hour ride each day on as bumpy a conveyance as was possible.

During the past five years patients with paralysis agitans were given four types of treatment, as well as combinations of them: physical therapy, psychotherapy, surgical treatment, and drug therapy.

The physical therapy consisted of either the routine therapy with massage and passive motion, or intensive progressive resistance exercises of the involved muscles under the direction of Dr. T. L. DeLorme. As concerns the effect of physical therapy of the routine type—namely, referral of the patient to the physical therapy department two or three times a week for massage and passive motion, or having a masseur come to the patient's home two or three times a week for the same treatment—Schwab and Prichard formed the following impression: During the actual massage and passive exercises the patient almost always felt better. He was more relaxed and comfortable. As soon as the patient left the physical therapy department, his symptoms returned, and the benefit of the treatment lasted only an hour or two at the very most. There was no evidence in this type of physical therapy of any true benefit, change in symptoms, improvement in signs or alteration in the progress or state of the disease.

The special approach through progressive resistance exercises is a separate project, in which a specific weakness or stiffness in one muscle group —for example, in the left leg, or even both legs—rather than a generalized involvement, is the chief disability. These patients are seen in consultation with Dr. T. L. DeLorme and are taken into this project only if they are willing to come in for two to three hours' treatment, four times a week, for two to three months. The other forms of therapy, usually medication, which the patients have been receiving are kept exactly the same throughout this period of observation. Careful assessment is made each week of changes in signs and in the patient's ability to perform his usual tasks at home and at work. At the end of the project the treatment is stopped for a period of at least a month to see whether any improvement attained has regressed.

In a preliminary group of five patients receiving this type of treatment, three have greatly improved in their strength and muscle function and in the ability to use these muscles in normal activities, such as walking and climbing stairs. There has also been a favorable improvement in mood. However, there is no alteration in the objective signs, such as tremor or rigidity or loss of associated movements. One patient in this group continued for six weeks and then reverted suddenly to the previous level after he had been badly shaken up in an automobile accident. This stress was sufficient to make the period of treatment following the accident (one month) ineffective. The fifth patient showed no improvement in any form, and the treatment was discontinued at the end of a month.

Standing Device for Paraplegic Patients

Florence I. Mahoney, M.D., and Quinton W. Goode, Memphis. In ARCHIVES OF PHYSICAL MEDICINE, 32:7:456, July 1951.

An apparatus has been designed which makes it possible for a patient to be completely independent in getting himself to the standing position for work and down again to rest or work at a table.

The standing apparatus consists of a canvas corset mounted on a plywood board by means of rivets. Two round steel plugs are welded, ten inches apart, into a narrow steel plate, and this plate, in turn, is riveted into the plywood. The corset is adjustable and can be strapped on by the patient while he sits in his wheel chair.

The padded portion is placed against the patient's chest and upper abdomen, and the belt is wrapped around his body and buckled. The corset is made with two canvas pieces, the lower one used for low lesions, and both used for high lesions, or if the patient's balance is poor. Then he can wheel himself to his intended work station, lock his long-leg braces in extension and pull himself erect in front of the flat steel vertical bar, which is fastened securely to a work bench or the machine he wishes to use. The two round metal plugs that are welded into the corset are inserted into the holes in the bar that fit the patient's height. Then he presses himself against the bar, making the tapered ends of the plugs force open the parallelogram locking system. Spring tension closes the parallelogram into the notches in the two plugs. An extra pin is placed into the parallelogram for safety. The patient thus is

held securely upright and may proceed to work. To release himself, the patient may either unbuckle his corset or pull the release trigger forcing open the parallelogram. He then pushes himself backward about two inches and lowers himself into his chair, or if he desires, may walk away with his crutches. By similar maneuvers, he may change to several work stations in the manual arts clinic.

This device has been used only a few months, but has proved effective in motivating patients to get back to ambulating and standing. It is stable enough to give a patient complete confidence, no matter what his level.

Present and Future Plans for the Rehabilitation of Patients in General Hospitals

Nila Kirkpatrick Covalt, M.D., Rocky Hill, Conn. In THE MODERN HOSPITAL, 76:4:94, April 1951.

Despite the published information, the growing interest in the field, and the actual establishment of rehabilitation programs, it is an all too common fallacy to consider that programs of physical medicine and rehabilitation are unnecessary in acute general hospitals and belong only in institutions which care for long-term illnesses and chronic disabilities. In the majority of instances, early treatment in an acute hospital can prevent a patient from becoming helpless, even though he may be left with a chronic disability. This lessens the burden of the ever-increasing number of individuals who must be cared for in chronic hospitals or convalescent homes.

An amputee needs bed positioning within twenty-four hours after his operation, with stump exercises instituted as rapidly as possible—often within forty-eight hours. A unilateral amputee can be started on crutch training after only a few postoperative days. At that, no amount of guided exercise the patient does daily will be adequate to prepare him completely for prosthesis walking.

Once a prosthesis is procured, the physician refers the patient to a physical therapist for walking training. This training takes one to three months, depending upon the site or sites of the amputation (above, below the knee, or bilateral), and upon the motivation of the patient. Training can be done with outpatient visits. It is accomplished more rapidly, and with a better walking pattern, if the amputee can remain at the training center and have concentrated treatment throughout a full day. Training in the use of an arm prosthesis usually is done by an occupational therapist. That training does not take as long.

It is true that there is a shortage of physicians trained in physical medicine and in the other rehabilitation technics. There is a shortage of qualified physical therapists, qualified occupational therapists, speech therapists, social workers, and other ancillary personnel necessary to furnish a total rehabilitation program, even if the physical facilities are available.

The object of this discussion is to show how rehabilitation programs can be started even when trained physicians and therapists are not available and even when adequate space, or money to build adequate space in hospitals, is not procurable. It is quite possible to start programs within any presently operating facility—although adequate space should be considered and included in building programs now contemplated, and in all future planning. Physicians and physical therapists will be available in time; adequate space should be allocated pending that time.

Present and Future Plans for the Rehabilitation of Patients in General Hospitals—II

Nila Kirkpatrick Covalt, M.D., Rocky Hill, Conn. In THE MODERN HOSPITAL, 76:5:96, May 1951.

Physical medicine basically comprises the two divisions of occupational therapy and physical therapy. The minimum equipment and space for physical therapy in any hospital containing up to three hundred beds is eight treatment tables in 8 x 8 foot cubicles. Ideally, there should be treatment *rooms*, with a large adjoining gymnasium.

A gymnasium is more important at the start of a program than is the treatment room containing treatment tables and the various modalities used in physical medicine, particularly when no physiatrist is available. Many exercises are best given on mats, where patients can do more exercises with a more nearly complete range of motion and without the fear of falling which they have on a table. Progressive exercises, such as crawling or short-crutch walking, can be done only on mats.

Functional training in "Activities of Daily Living," walking retraining, and crutch walking are based upon a sound knowledge of kinesiology. This knowledge of muscle action is the basic knowledge for physical therapists particularly, and to only a slightly lesser extent for occupational therapists. Because of this specialized training, it is easier for therapists to retrain patients than it is for individuals without such knowledge to do the training. However, these procedures are not so specific as definitive muscle reeducation and proper choice of many therapeutic exercises which therapists must do. Hence, a physical therapist can teach the principles of crutch walking and functional training to any interested nurse, other hospital personnel, or to relatives. Therapists can also give instruction in correct bed positioning. Lantern slides and movies are available on loan from various sources which show some of the technics.

If it is impossible for a hospital to hire a qualified physical therapist, there are therapists probably available in most states who can be called in as consultants to help train the hospital personnel. Sometimes therapists are employed in various sections of state departments of health and the state would be willing to loan them.

If it is impossible to complete all training in self-care activities without the use of braces, then they too should be provided. Early bracing and attention to the details of bracing are important aspects of rehabilitation and are the physicians' problems. Training in their use (including putting the braces on and taking them off) are therapists' and nurses' problems. Walking reeducation with prostheses is the therapists' problem.

Second Attacks of Poliomyelitis: Report of a Case with Autopsy Findings

Archibald L. Hoyne, M.D., Chicago, and Irving Lipton, M.D., Van Nuys, Calif. In THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 146:8:707, June 23, 1951.

A second attack of poliomyelitis with fatal termination and autopsy findings is presented. It is probable that this is the only reported authentic second attack with fatal outcome. Moreover, it is the first case recorded with complete pathological examination. On gross and microscopic examination the nervous system exemplified evidence of both recent and past pathology. It has been suggested that second attacks of poliomyelitis are due to an immunologically different strain, against which the patient has no previous immunity.

The Orthopedic Management of Arthritis

Paul C. Colonna, M.D., Philadelphia. In THE PENNSYLVANIA MEDICAL JOURNAL, 54:5:443, May 1951.

In the early stage of arthritis, many of the joint deformities can be obviated by careful attention to the sleeping position of the patient, by the use of fracture boards under the mattresses, and by stressing better body balance in walking. Simply the weight of the bedclothes is a factor in producing an equinus or drooping of the foot in those patients recumbent much of the time. Allowing the patient to relax in bed in a semi-Fowler position may give rise to hip and knee contractures as well as deformities of the spine. If simple conservative measures are neglected in the early phase, very resistant deformities may be developed later. Measures directed toward better body posture and improvement of local circulation in the impaired joint by the various modalities of physical medicine, stressing the loss of excess bodyweight and the restriction of weight bearing when the arthritis involves the lower extremities, are all-important. Non-weight-bearing exercises, such as swimming and exercises under the control of the physical therapist, can usually be recommended. Splints and braces all have their places in the conservative management.

Fatigue, exposure to damp atmospheric conditions, mental worry, and emotional strain of one sort or another can definitely aggravate the picture, and in the rehabilitation of these patients many factors must be considered on a psychosomatic basis. Rehabilitation always is a slow process, and the aim in these patients rarely can be to cure the patient, for in most of them certain irreparable damage has been done to the affected joint or joints. However, the patient can be made more comfortable and able to return to a gainful occupation.

Foreign Abstracts . . . . .

Muscle Imbalance and its Treatment in Athletic Injuries

John Bowman, M.C.S.P., In PHYSIOTHERAPY, 37:4:69, April 1951.

The key to athletic treatment is the muscle imbalance which takes place as a result of injury. Not sufficient attention is paid during treatment to its correction and prevention and to the fact that, in most cases, it is due to minor injuries. There is no doubt that the best part of the athletic injuries we shall have to treat are of a minor nature; contusions, sprains, and strains constitute about 90 percent, while the remainder consist of fractures and severe joint injuries, these latter coming within the usual hospital category.

Dr. Thorndike recorded the athletic injury figure at Harvard College for a period of nine years, showing that sprains, strains, and contusions comprised approximately 80 percent of the cases considered, fractures and dislocations amounting to only 20 percent.

It is generally accepted that all body movements are a mass of simple reflexes, integrated and coordinated into the various patterns of movement the body may require, the initiator and controlling area being the cerebrum. Constant repetition of these patterns will bring specialization and economy of effort; from the child to the adult, practice brings the required coordination of adult life. The athlete, through coaching and training, specializes in his particular game of sport; his balance mechanism, coordination, and reciprocal innervation reach a high degree of perfection. These subjects—balance, coordination, and muscle imbalance—have been dealt with by a considerable number of workers, but there yet remains a considerable amount to be discovered. There is, for instance, the question of muscle tone. We have been taught that it is a state of constant partial contraction, supplied by relays of muscle fibres, but Schneider and Karpovitch in *Physiology of Muscular Activity* emphasize that, since no action potentials can be elicited from relaxed muscles, tone cannot be explained in this way, and a different explanation must be sought.

Any movement, good or bad, with usage and constant repetition will become the accepted movement; the athlete selects the best for his particular sport, and any factor that results in his not being able to use these efficient movements results in muscle imbalance and athletic inefficiency.

Pain is the chief cause of muscle imbalance, though it may in some cases be due to some other factor such as fatigue, muscle wasting, or a loose body joint, in which latter instances there need not be an undue amount of pain.

Fatigue. Next, and very important indeed, because it will create a vicious circle of muscle imbalance, comes fatigue. Wherever there is pain and imbalance there will be fatigue.

Muscle Wasting. If imbalance and fatigue are allowed to continue, they will be followed by muscle wasting, which now makes the picture a very complicated one, for, although the mechanics of the injured area were unstable before, they are many more times so now, for muscle wasting, with or without the presence of pain, results in further muscle imbalance.

Reflex Inhibition. The next imbalance factor is reflex inhibition. Most of us will probably have experienced a sense of weakness following injury. This is very common after injury to the knee joint, there being reflex inhibition of the quadriceps. Reflex inhibition varies considerably in degree, and it is brought about by reason of a disturbance in the reflex arc produced by the initial injury.

Psychology. The most concrete fact from the psychological viewpoint is that when an injury takes place, it is recorded in the mind. The impression it makes and the time it lasts will depend in most cases on the severity of the injury, pain, and the length of time necessary to obtain complete recovery. While this injury impression lasts, there will be an anxiety factor as to athletic efficiency, and the fear of a breakdown. Hence the importance of a speedy recovery and the elimination of pain.

Circulation. So far I have only stressed the disturbed body mechanics that are likely to take place as a result of injury. There are also the all-important circulatory disturbances which are present with muscle imbalance. It is interference with the circulation which is responsible for the early onset of fatigue due to the abnormal muscle tension present with pain and poor body mechanics. The importance of circulation to recovery and function is obvious to everyone.

The treatment program must be one which is aimed at a speedy restoration of muscle balance with its immediate circulatory effects. The athlete must not be allowed to develop bad patterns of movement and the vicious circle which such false patterns produce. The development of bad movements may only be overcome with considerable effort, thus lengthening the duration of recovery.

Therapeutic Value of Massage to the Connective Tissue in Peripheral Vascular Disturbance of the Extremities

By R. Volker and E. Rostosky. In NEDERLANDS TIJDSCHRIFT VOOR HEILGYMNASTIEK, MASSAGE EN PHYSIOTECHNIEK. *(Translated and abstracted by Yvonne Kray, physical therapist at the Institute for Physical Medicine and Rehabilitation, New York City.)*

According to studies made by Kohlrausch, diseases of internal organs can be favorably influenced by elimination of segmental hypertonic muscle zones. The function of massage is to reduce the pathological changes in the tension of the skin and subcutaneous tissues. His theory is based on the assumption that changes in these tissues enable the segmental vegetative reflexes to produce more blood circulation, thereby improving the function of the corresponding visceral area.

The method of massage employed is a stroking movement, exerting a slight amount of pull, preferably with the third and fourth fingers, superficial at first, slowly becoming deeper. The massage is started in the sacral region, then worked upward. It is important to start on a new segment only after the tension in the segment below has been released. When the patient complains of a disagreeable sensation of pressure, unreleased tension is indicated.

In the case of peripheral vascular disease, the massage is also started in the sacral region. If the vascular disturbance is in the legs, the massage is limited to the connective tissue of the entire pelvic area, usually followed by a few strokes on the abdomen and thigh. In the case of vascular disturbance of the upper extremities, the massage extends from the pelvic region up to the shoulder girdle. However, it is possible to get good results in the upper extremity by massaging only the pelvic region, provided that a "positive connective tissue diagnosis" has been established.

Good results have been obtained in cases of arteriosclerosis, diabetic circulatory disturbances, trophic ulcers on amputation stumps. No changes were observed in cases of Raynaud's disease. The assumption that the vasodilatation takes place via sympathetic innervation does not seem to hold. Tests show that the increased blood flow following connective tissue massage takes place even after a bilateral lumbar sympathectomy.

Use of Electrotherapy in Peripheral Paresis

By M. Gukelberger, Ph.D. In DER HEILMASSEUR PHYSIOPRAKTIKER, Thalwil, Switzerland, No. 115, December 1950. *(Translated and abstracted by Joseph M. Breuer, staff physical therapist, Hospital for Joint Diseases, New York City.)*

Electrotherapy in cases of peripheral paresis or paralysis should be used within the general framework of *therapeutic exercise*. In severe cases electrotherapy must be attempted for a considerable length of time.

While in light or medium-severe cases exercise is all-important and sufficient as a therapy, the specially developed technic of intramuscular and perineurial galvanic shocks has proven its efficiency in the most severe paresis.

Intramuscular galvanization is particularly indicated in the treatment of deep-layer muscles and/or nerves, i.e., m. tibialis posterior, m. hallucis longus, the deep muscular layers of the pelvis, m. serratus anterior, and m. subscapularis. Method: under local anesthesia, an electrode needle is inserted directly into the affected muscle. The indifferent electrode can be used with either a large or a small surface, and the reaction will vary accordingly.

Perineurial galvanizations are used mainly for treatment of the more superficial muscles. The technic there is similar.

Intramuscular galvanization has been used with good results for diagnostic purposes in polio to determine the prognosis of conservative treatment.

Book Reviews . . . . .

Human Physiology. *By Bernardo A. Houssay, M.D., Professor of Physiology, Director of the Institute of Biology and Experimental Medicine, Buenos Aires; Juan T. Lewis, M.D., Professor of Physiology, Director of the Institute for Medical Research, Rosario, Argentina; Oscar Orias, M.D., Professor of Physiology, Director of Mercedes and Martin Ferreyra Institute for Medical Research, Cordoba, Argentina; Eduardo Braun Menendez, M.D., Professor of Physiology, Member of Institute of Biology and Experimental Medicine, Buenos Aires; Enrique Hug, M.D., Professor of Pharmacology of the School of Medicine, Rosario, Argentina; Virgilio G. Foglia, M.D., Professor of Physiology, Member of Institute of Biology and Experimental Medicine, Buenos Aires; Luis F. Leloir, M.D., Director, Institute for Biochemical Research, Campomar Foundation, Buenos Aires. Translated by Juan T. Lewis, M.D., and Olive T. Lewis. Pp. 1118, 499 illus. Price, $14.00. McGraw-Hill Book Company, New York, 1951.*

I am writing this review as a morphologist, rather than as a functionalist, i.e., a physiologist, but I write it keenly aware of the integration of form and function. The word "integration" is, perhaps, an acceptable keynote for this noteworthy volume. Led by Nobel Laureate Houssay, the contributors have brought together a remarkably coordinated synthesis of modern human physiology. There is very little feeling of particularism as the several contributions are studied. Moreover, while the book was written with medical students and doctors of medicine in mind, it nevertheless is written with such clear exposition that all students concerned with human morphophysiology will find it profitable. Houssay says in his Preface that "the English version is . . . not merely a translation but a second edition of the book."

There are nine major sections: the internal environment and the blood, circulation, respiration, digestion, metabolism and nutrition, internal secretions, reproduction, the formation and excretion of urine, and the nervous system. From these sections we may select for special attention certain areas pertinent to physical therapy, e.g., the physiology of physical exercise, the endocrines, the regulation of posture, and cortical integration of movement.

The authors feel that, because we live in a mechanical age, sedentary habits "have made physical exercise necessary for the maintenance of health." Accordingly, there is provided an intensive analysis of bodily changes produced by exercise: 0 consumption, cc. per min.; 0 debt, liters; lactacidemia, mg. per 100 cc. blood;

respiratory rate; inspiratory vol. in cc.; ventilation, liters per min.; circulatory changes in pulse rate; systolic output in cc.; min. vol. in liters; systolic bl. pr., mm. Hg.; and temperature in C°. Dill's classification of three types of exercise is followed: *moderate,* when 0 consumption is up to three times the basal rate; *heavy,* when it is three to eight times the basal rate; and *maximum,* when it is more than eight times the basal rate. The hyperpnea of exercise is credited mainly to nerve impulses from the active limbs and lungs, or irradiated from the cortex to the respiratory center, plus increase in CO_2 and decrease in pH in the blood, the accumulation of lactic acid, as well as changes in the circulatory center, and possibly impulses from the carotid and aortic bodies. In organic functioning about 75 percent of the energy used is converted into heat. In exercise, heat production exceeds the rate of heat loss; hence the temperature goes up.

An important statement is made when the authors conclude that "repeated exercise increases the working capacity of the organism." By training there is increased strength, sustained effort, and greater accuracy and precision of movement. Even so, man's maximum motor (energy-using) efficiency is only 25 percent. For increased capacity for work—for those in athletic or heavy labor tasks—proteins, carbohydrates, and fats must figure prominently in the diet. The authors give many useful tables in the discussion of the physiology of exercise, and in chapters on carbohydrate, fat, and protein metabolism. The chapters on vitamins and the normal diet of man are especially useful.

This review is already over-long, but it cannot do justice—no matter how long it is—to the jam-packed chapters on the endocrines. Their relations to metabolism, to morphogenesis, to reproduction, to nervous and mental qualities, to immunity, and to the vital organic processes of life form the highlight of the book. "Human Physiology" is text- and source-book in one. To the physical therapist it should be a *vade mecum;* it will be studied and consulted on countless occasions. There are pertinent and major bibliographic references throughout, and there is a critical index.

Reviewed by WILTON MARION KROGMAN, PH.D., *Professor of Physical Anthropology, Graduate School of Medicine, University of Pennsylvania.*

Fever Therapy. *By H. Worley Kendell, M.D., F.A.C.S., Professor of Physical Medicine and Rehabilitation, University of Illinois Research and Educational Hospitals. (A monograph in the American Lecture Series—#80—of the American Lectures in Physical Medicine.) Simulated leather. Price, $2.25. Pp. 101, with 15 illus. Charles C Thomas, Springfield, Ill., 1951.*

This book, by Dr. Kendell, Professor of Physical Medicine and Rehabilitation, University of Illinois, Research and Educational Hospitals, Chicago, is one of a series of monographs in American Lectures in Physical Medicine. It represents a complete and authentic story of physically-induced fever in treatment. The methods and technics of fever therapy, the dangers, complications, and safeguards necessary to careful fever therapy are all explained. The physiological effects of physically-induced fever, which underlie the patient's symptoms during treatment, are discussed. Fever therapy, which has run the gamut of trial in many diseases, has now become established as making a definite contribution in the treatment of a very limited number of diseases. The indications and technic in these diseases are elaborated.

The reviewer finds but one point on which he would take issue with the writer, and that is that "fever therapy must be given by a physiatrist and should be administered by a physical therapist." An integrated team of physician and nurse is indicated for fever therapy. Unless a physical therapist has the background of nursing to draw from, I would not feel that she should be entrusted with the care of these patients, who, by the treatment itself, are made exceedingly ill. Three months of special training of a physical therapist, without a nursing background, would hardly fit her for the multitudinous problems which may arise in nursing a fever patient.

Fever therapy, as a regular service, is more or less being deleted in hospitals, this due to the fact that many of the conditions, which previously could only be treated successfully with fever therapy, can now be handled by the various antibiotics. There is no doubt that there are still some cases of syphilis in which the disease cannot be eradicated with the antibiotics alone, but can be favorably affected when combined with fever therapy.

For one who remains interested in fever therapy there is no better book to be offered than this small treatise by Dr. Kendell. It is based upon some fifteen or more years of outstanding personal service in the field.

The publishers are developing these monographs as small pocket-sized manuals, neatly bound in imitation leather, printed on glazed paper for easy legibility, with no stinting of illustrations. Both the author and the publisher are to be congratulated on this useful book.

Reviewed by WILLIAM BENHAM SNOW, M.D., *Director of Physical and Occupational Therapy, Columbia-Presbyterian Medical Center, New York City.*

The American Illustrated Medical Dictionary, 22nd edit. *W. A. Newman Dorland, A.M., M.D., F.A.C.S., Lt. Col., MRC, U.S. Army, Former Member of the Committee on Nomenclature and Classification of Diseases of the American Medical Association. Pp. 1736, 720 illus., including 48 Plates. Price, $10.00. W. B. Saunders Company, Philadelphia and London, 1951.*

This edition of the dictionary includes 1736 pages and has brought medical terminology up to date. In doing so, and in order to avoid unnecessary bulk, a considerable number of cross-references have been deleted. Rapid advances in medical progress have made necessary the inclusion of many new terms in pharmacology, endocrinology, and biochemistry, including isotopes of the chemical elements.

As a new feature of the book, an article on Fundamentals of Medical Etymology and a Table of Modern Drugs and Dosage have been added. These serve as a good foundation for understanding and as a convenient reference to the newer pharmacology.

A considerable number of color plates enhance the more complicated descriptive material.

The book is bound with a soft leather cover and the pages are of light weight semi-gloss paper.

This up-to-date descriptive reference dictionary is a welcome addition to the bookshelves of modern medicine.

Both the author and printer deserve much credit for the exhaustive effort involved in modernizing such a text.

Reviewed by WILLIAM BENHAM SNOW, M.D., *Director of Physical and Occupational Therapy, Columbia-Presbyterian Medical Center.*

Schools of Physical Therapy

APPROVED BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS
OF THE AMERICAN MEDICAL ASSOCIATION

Graduates of these schools are eligible for membership in the American Physical Therapy Association.

Name and Location of School	Medical Director and Technical Director	Entrance Requirements	Length of Course	Classes Start	Certificate, Degree, or Diploma
CALIFORNIA					
[1]**Childrens Hospital Society,** Los Angeles (in affiliation with University of California, Los Angeles)	Samuel S. Mathews, M.D. Mary J. Dodge	a^3-b^3-d-e g^4	14 mo 4 yrs	Sept	Certificate Degree
[1]**College of Medical Evangelists,** Loma Linda	F. B. Moor, M.D. R. Wm. Berdan	a-b-c-d-e g	15 mo 4 yrs	Sept	Certificate Degree
[1]**Univ. of So. California,** Los Angeles	Charles L. Lowman, M.D. Charlotte W. Anderson	a-b-d-e g^4	14 mo 4 yrs	Sept Sept-Feb	Certificate Degree & Cert.
[1]**Univ. of California Medical School,** San Francisco	Lucile M. Eising, M.D. Margery Wagner	d-e g	12 mo 4 yrs	Sept	Certificate Degree
[1]**Stanford Univ.,** Palo Alto	Wm. Northway, M.D. Lucille Daniels	a-d-e-f g^4	12 mo 4 yrs	Jan-June or Sept	Certificate Degree
COLORADO					
[1]**Univ. of Colorado Medical Center,** Denver	Harold Dinken, M.D.	a^3-b-d-e g^4	12 mo 4 yrs	Sept	Certificate Degree
ILLINOIS					
Northwestern Univ. Medical School, Chicago	Emil D. W. Hauser, M.D. Gertrude Beard	a-b^3-d-e	12 mo	Oct	Certificate
IOWA					
[1]**Univ. of Iowa,** Iowa City	W. D. Paul, M.D. Olive C. Farr	b-e	12 mo	Sept	Certificate
KANSAS					
[1]**Univ. of Kansas School of Medicine,** Kansas City	Donald L. Rose, M.D. Ruth Monteith	a-b-d-e g^4	12 mo 4 yrs	Feb-Sept	Certificate Degree
MASSACHUSETTS					
Bouve-Boston School of Physical Education, in affiliation with Tufts College, Medford 55	Howard Moore, M.D. Constance K. Greene	g^4	4 yrs	Sept	Degree
Simmons College, Boston	{Wm. T. Green, M.D. {Arthur L. Watkins, M.D. Shirley Cogland	a^3-b-d-e g^4	16 mo 4½ yrs	Sept	Certificate Degree
Boston Univ.-College of Physical Education for Women, Sargent, Cambridge	Kenneth Christophe, M.D. Adelaide McGarrett	a-b-d-e f-g^4	12 mo 2 or 4 yrs	Sept	Certificate Degree
MINNESOTA					
[1]**Univ. of Minnesota,** Minneapolis	Frederic J. Kottke, M.D. Ruby Green Overmann	d-f-g^4	2 yrs	Sept	Degree
[1]**Mayo Clinic,** Rochester	Earl C. Elkins, M.D. Darrell Hunt	a-b-c-d-e	2 yrs	Sept	Certificate
MISSOURI					
[1]**Washington Univ. School of Medicine,** St. Louis	Sedgwick Mead, M.D. Beatrice F. Schulz	f-g^4	2 or 4 yrs	Sept	Degree
[1]**St. Louis Univ. School of Nursing,** St. Louis	A. J. Kotkis, M.D. Sr. Mary Imelda	f-g^4	2 or 4 yrs	Jan-Sept	Degree

Name and Location of School	Medical Director and Technical Director	Entrance Requirements	Length of Course	Classes Start	Certificate, Degree, or Diploma
NEW YORK					
Albany Hospital, Albany	John W. Ghormley, M.D.	a-b-d-e	12 mo	Sept	Certificate
(in affiliation with Russell Sage College, Troy)	Catherine Graham	g[4]	4 yrs		Degree
[1]**Columbia Univ.,** New York	Wm. B. Snow, M.D.	a-b[3]-e	12 mo	Sept	Certificate
	Floy Pinkerton	f	2 yrs		Degree
[1]**New York Univ., School of Education,** New York	George G. Deaver, M.D.	a[3]-b[3]-d-e	12 mo	Sept	Certificate
	Elizabeth C. Addoms	g[4]	4 yrs		Degree
NORTH CAROLINA					
[1]**Duke Univ., School of Medicine,** Durham	Lenox Baker, M.D.	a[3]-b[3]-d-e	15 mo	Oct	Certificate
	Helen Kaiser				
OHIO					
[1]**Cleveland Clinic,** Cleveland	Walter J. Zeiter, M.D.	a-b-d-e	12 mo	Oct	Certificate
	Mildred Heap				
PENNSYLVANIA					
[1]**D. T. Watson School of Physiatrics,** Leetsdale	Jessie Wright, M.D.	a[3]-b[3]-d-e	12 mo	Oct	Diploma
	Kathryn Kelley				
[1]**Univ. of Pa. School of Auxiliary Med. Serv.,** Division of Physical Therapy, Philadelphia	George M. Piersol, M.D.	e	12 mo	Sept-Feb	Certificate
	Dorothy Baethke	g[4]	4 yrs	Sept	Cert. & Degree
TEXAS					
[1]**Hermann Hospital,** Houston	Oscar O. Selke, Jr., M.D.	a-b-d-e	12 mo	Oct	Certificate
	Mary Elizabeth Kolb				
[1]**Univ. of Texas School of Medicine,** Galveston	G. W. N. Eggers, M.D.	a-b-e	12 mo	Jan	Certificate
	Ruby Decker	d			Degree
VIRGINIA					
[1]**Med. College of Va.,** Baruch Center of Phys. Med., Richmond (in affiliation with Richmond Prof. Inst.)	Walter J. Lee, M.D.	a-b-d-e	12 mo	Sept	Diploma
	Susanne Hirt	g[4]	4 yrs		Degree
WISCONSIN					
[1]**Univ. of Wisconsin Med. School,** Madison	Harry D. Bouman, M.D.	a-b-c-e-f	12 mo	Sept	Certificate
	Margaret Kohli	g[4]	4 yrs	Sept-Feb	Cert. & Degree
U. S. ARMY MEDICAL SERVICE					
(a) **Medical Field Service School,** Brooke Army Medical Center, San Antonio, Texas, and	Charles D. Shields, Lt. Col., M.C. Agnes P. Snyder, Major, WMSC	b-e	12[2]	Mar-Sept	Certificate
(b) **Fitzsimons Army Hospital,** Denver, Colorado	H. B. Luscombe, Col., M.C. Harriet S. Lee, Major, WMSC	Completion of Medical Field Service School			
(c) **Walter Reed Army Hospital,** Washington, D. C.	John H. Kuitert, Lt. Col., M.C. Brunetta Kuehlthau, Major, WMSC	Completion of Medical Field Service School			
(d) **Letterman Army Hospital,** San Francisco	Arthur E. White, Col., M.C. Emma T. Harr, Major, WMSC	Completion of Medical Field Service School			

Entrance Requirements

FOR ONE-YEAR COURSE

a = Graduation from accredited school of nursing.
b = Baccalaureate degree with major in physical education.
c = Two years of college with science courses.
d = Three years of college with science courses.
e = Baccalaureate degree with required science courses.

FOR TWO-YEAR COURSE

f = Two years of college with science courses.

FOR FOUR-YEAR COURSE

g = High school graduation.

Footnotes

[1]Male students admitted.

[2]12 months' course includes training at the Medical Field Service School and Fitzsimons, Walter Reed, or Letterman Army Hospitals. Apply directly to the Surgeon General, Department of the Army, Washington 25, D. C.

[3]Additional college science credits required.

[4]Advanced standing students accepted.

Please address initial correspondence to the School of Physical Therapy in the institutions listed. Tuition and fees will vary from school to school.

Meet Our New Contributors

Signe Brunnstrom, Director of Physical Therapy, Kessler Institute for Rehabilitation, West Orange, N. J. Miss Brunnstrom received her undergraduate training at Uppsala College and the Royal Gymnastic Central Institute, Sweden, and has also received a master's degree from New York University. She has served on the staff of the Hospital for Special Surgery, and was also technical director of its school of physical therapy from 1936-38. As a lieutenant, Miss Brunnstrom served at the U. S. Naval Hospital, Mare Island, Calif., for three years. She has worked on several prosthetic testing and research projects, and last year she was granted a leave of absence from Kessler Institute in order to accept a Fulbright grant as "Visiting Lecturer to Greece." Although her name has not appeared recently, Miss Brunnstrom has been a frequent contributor to the REVIEW. She is a member of the American Physical Therapy Association and of the American Registry of Physical Therapists.

Natalie Murdoch Darwin, physical therapist, Hillcrest Memorial Hospital, Tulsa, Okla. Mrs. Darwin received a B.A. from the University of New Mexico, an M.Ed. from Boston University, and an M.A. from Stanford University. She studied physical therapy at O'Reilly General Hospital and served in the Army for three years. Before assuming her present position Mrs. Darwin was head physical therapist at the Veterans Administration Hospital, Excelsior Springs, Mo. She is a member of the American Physical Therapy Association and the American Registry of Physical Therapists.

Mabel E. Holton, Supervisor of Physical Therapy, W. A. Foote Memorial Hospital, Jackson, Mich. Miss Holton was graduated from the University of Michigan and received her physical therapy training from Harvard University-Children's Hospital. She has been a staff therapist at Leland School, Detroit, and at Georgia Warm Springs Foundation. Miss Holton has held supervisory positions at University Hospital, Ann Arbor, Mich., Betty Bacharach Home, Longport, N. J., and the Cleveland Rehabilitation Center. Miss Holton is presently serving as president of the Michigan chapter of the American Physical Therapy Association.

Classified WANT-ADS

WANTED: Qualified physical therapist assistant. 70-bed general hospital. Salary open. Write: Miss Margareth Gruber, P.T. Dept., Pittsburg Community Hospital District, Pittsburg, California.

WANTED: Female physical therapist. Fully equipped department. Please write giving age, qualifications, picture, and date available. Lima Memorial Hospital, Lima, Ohio.

WANTED: Qualified physical therapist for work in Cerebral Palsy Treatment Center. Scholarship available for additional training in C.P. Attractive salary. Good working conditions. Directed by Diplomate, American Board of Phys. Med. Write H. L. Rudolph, M.D., 400 N. 5th St., Reading, Pa.

WANTED: A physical therapist to work in the Crippled Children's School of the Gary Public School System. If interested, write to Dana P. Whitmer, 524 Garfield Street, Gary, Indiana.

PHYSICAL THERAPIST, registered or APTA member only, wanted for rehabilitation institute in Washington, D. C. Treatment by muscle re-education of paralysis resulting from neuromuscular diseases or injuries. All therapy given under close supervision of physicians. Excellent beginning salary with regular increases. Paid vacations; sick leave; free hospitalization insurance. Give age, references, picture, and date of availability. Address replies to Box 36, care of the Physical Therapy Review, 1790 Broadway, New York 19, N. Y.

WANTED: Qualified physical therapist for 400-bed general hospital. Orthopedic and polio work primarily. Write F. D. Peters, Physical Therapy Department, Iowa Methodist Hospital, Des Moines, Iowa.

WANTED: Physical therapist for general hospital with large outpatient department to work with variety of cases. Beginning salary dependent on experience. Automatic raises. Write: Miss Alberta Seavey, P.T., Copley Memorial Hospital, Aurora, Illinois.

RATES

The rate per insertion is 75c per line. Typewrite your advertisement carefully and count 50 characters and spaces per line.

ALL WANT-ADS MUST BE PAID FOR IN ADVANCE. Make checks or money orders payable to the American Physical Therapy Association.

Institutions or physical therapists who do not wish their identity known may arrange for Blind Ad Code No. All such want-ads must include the following which will be counted as 2 lines:

Address replies to ..... care of **The Physical Therapy Review, 1790 Broadway, New York 19, N. Y.**

It is requested that descriptive adjectives be used instead of actual figures when referring to salary.

IMPORTANT

It is understood and agreed that the publisher shall have the right to reject or change the wording of any advertisement which in the opinion of the Editorial Board shall not be in agreement with the ethical standing of this publication; the advertiser agreeing that the Editorial Commitee shall be the sole and exclusive judge of the acceptance of any advertisement.

DEAD LINE

Copy for want-ads must be submitted to the American Physical Therapy Association by the 1st of the month **PRECEDING MONTH OF ISSUE.**

Chapter Directory

Alabama

President, George Beni Arnold, 121 S. Ann St., Mobile 20
Secretary, Ethel Mae Norton, 726 S. 34 St., Birmingham

Arizona

President, Mrs. A. Muriel W. Weber, 2404 E. Piccadilly Rd., Phoenix
Secretary, Mrs. June E. Walker, 1838 N. 37 Pl., N.E., Phoenix

Arkansas

President, Geraldine Larson, 2112 Riverview, Little Rock
Secretary, Ewing Guthrie, 314 N. Spruce, Little Rock

California

Northern California:
President, Maxine Schuldt, 1680 Mission St., San Francisco
Secretary, Mrs. Margaret B. Farley, 2620 McAllister St., San Francisco
Santa Barbara:
President, Mrs. Rhoda Roberts, Ventura Co. Hosp., Ventura
Secretary, Mary Isham, 1734 State St., Santa Barbara
Southern California:
President, Mrs. Roxie Morris, 9616 San Gabriel St., South Gate
Secretary, Mrs. Mary Dodge, 11225 Ivy Pl., Los Angeles 34

Carolina

President, Marguerite Watkins, P.T. Dept., Columbia Hosp. of Richland Co., Columbia 59, S. C.
Secretary, Mrs. Sally Lowe, Rex Hosp., Raleigh, N. C.

Colorado

President, Katharine Chilcote, V.A. Hosp., Ft. Logan
Secretary, Virginia Vickers, 756 Colorado Blvd., Denver

Connecticut

President, Herbert Jones, Hosp. for Chronic Illness, Rocky Hill
Secretary, Victoria Preitner, Hosp. for Chronic Illness, Rocky Hill

Delaware

President, Jean Wiley, 42 Hurst Rd., Deerhurst, Wilmington
Secretary, Appointment pending

District of Columbia

President, Dorothy E. Voss, 107 Thor Dr., Rte. 1, Falls Church, Va.
Secretary, Dorothy Barnhart, 918 18 St., N.W., Washington

Florida

President, Mrs. Audrey C. Lester, 300 Royal Palm Way, Palm Beach
Secretary, Mrs. John Hedrick, 2986 S.W. First St., Miami 35

Georgia

President, Mrs. Hazel Stephens, Warm Springs Found., Warm Springs
Secretary, Genevieve Collins, Warm Springs Found., Warm Springs

Idaho

President, Christine K. Kline, 1702 Jefferson St., Boise
Secretary, Anna Sweeley, 1719 N. 18 St., Boise

Illinois

President, Jean Roland, 2301 W. Farwell Ave., Chicago
Secretary, Beatrice Bozarth, 4206 N. Winchester Ave., Chicago 18

Indiana

President, Mrs. Patience Stom, 4625 Sunset Ave., Indianapolis
Secretary, Nelda Johnson, 3001 N. New Jersey St., Crossroads Rehab. Center, Indianapolis
Northern Indiana:
President, J. Nelson Mosher, 918 Bellevue Ave., South Bend
Secretary, Adeline Emmerling, South Bend Clinic, 120 N. Lafayette Blvd., South Bend

Iowa

President, Charlotte Vasey, 210 E. Davenport St., Iowa City
Secretary, Barbara Lee, Westlawn, Box 191, Iowa City

Kansas

President, Minerva W. Cheshire, 426 S. Green, Wichita 7
Secretary, Mrs. Fern Parker, 1002 N. Ridgewood, Wichita

Kentucky

President, Eloise Draper, 2511 Concord Dr., Louisville 13
Secretary, Mrs. Caroline Randolph, 146 Fenley Ave., Louisville

Louisiana

President, Audrey Ullman, Foundation Hosp., Jefferson Highway, New Orleans 21
Secretary, Merton Miller, Apt. C, 1033 Moss St., New Orleans

Maine

President, Lois M. Burns, Hyde Mem'l Home, Bath
Secretary, Rowena Walden, Me. Gen'l Hosp., Portland

Maryland

President, Dorothy Boynton, 219 Murdock Rd., Baltimore 12
Secretary, Mary F. McDowell, 1923 Taylor Ave., Baltimore 14

Massachusetts

President, Virginia Greenwood, 23 Oxford Rd., Newton Center
Secretary, Ruth Langley, 331 N. Main St., Randolph

Michigan

President, Mabel Holton, W. A. Foote Mem'l Hosp., Jackson
Secretary, Marjory W. Ketchum, 917 Leahy St., Muskegon Hgts.

Minnesota

President, Hazelle M. Erickson, 3416 Fifth Ave., S., Minneapolis
Secretary, Annette Larson, 177 Leavenworth St., St. Paul 11

Southern Minnesota:
President, Esther Swartz, 15 12 Ave., N.W., Rochester
Secretary, Frances Abendroth, 802 4 St., S.W., Rochester

Missouri

Eastern Missouri:
President, Lorraine Lake, 5534 Cates Ave., St. Louis 12, Mo.
Secretary, Mrs. Ruth Benz, 2919 Forrest Dr., Alton, Ill.

Western Missouri:
President, LaVerne McNabb, 610 Orient Dr., Kansas City, Kans.
Secretary, Mrs. Gloria Morton, 148 Pawnee, Lawrence, Kans.

Montana

President to be appointed.
Secretary, Dora Dykins, 214 Hawthorne Ave., Lewistown

Nebraska

President, Mrs. Mary Lindball, 3604 Grant St., Omaha
Secretary, Mrs. Betty Soder, 611 N. 42 St., Omaha

New Hampshire

President, Ruth Murray, River Rd., Penacook
Secretary, Mary Bullock, R.F.D. #4, Concord

New Jersey

President, Marie Heghinian, 307 Fairmount Ave., Jersey City 6
Secretary, Jean Smith, 294 Montgomery St., Bloomfield

New Mexico

President, A. Fern Green, Los Alamos Hosp., Los Alamos
Secretary, Hilda Voetberg, 58 S. Federal Pl., Santa Fe

New York

Central New York:
President, Donald McCuen, 101 Downing Rd., DeWitt
Secretary-Treasurer, Thelma Gwilt, 106 E. Beard Ave., Syracuse

Eastern New York:
President, Elizabeth Ammerman, 1168 Glenwood Blvd., Schenectady 8
Secretary, Betty Nichols, 30 Front St., Schenectady

New York Chapter:
President, Elizabeth Addoms, 1 Clark St., Brooklyn 2
Secretary, Stacy Psychoyos, 616 E. 26 St., Brooklyn 10

Western New York:
President, Verona Blair, 34 Milton St., Williamsville 21
Secretary, Dorothy Shaw, 333 Ashland Ave., Buffalo

Ohio

President, Sarah Martz, V.A., Cuyahoga Bldg., Cleveland 14
Secretary, Lucy Jones, Crile V.A. Hospital, Cleveland

Oklahoma

President, Mary E. Rexroad, 1423 N.W. 28, Okla. City
Secretary, Stella Spaulding, 6500 E. 11 St., Tulsa

Oregon

President, Mercedes Weiss, 2134 S.E. 57 Ave., Portland
Secretary, Elizabeth Fellows, 1535 S.W. 11 Ave., Portland Rehab. Center, Portland

Pennsylvania

President, Bessie D. Johnson, 2 E. Mercer Ave., Havertown
Secretary, Helen F. Snelbaker, 1311 Finance Bldg., Philadelphia 2

Western Pennsylvania:
President, R. Lewis Brown, 37 Florence Pl., Pittsburgh 28
Secretary, Martha Wratney, 1317 Iten St., Pittsburgh 12

Puerto Rico

President, Priscilla Jusino, 651 Miramar Ave., Stop 11, Santurce
Secretary, Alice Torres-Bulls, Box 1927, San Juan

Rhode Island

President, Helen Babcock, 12 Portland St., Providence
Secretary, Frances Roots, 81 Brown St., Providence 6

South Dakota

President, Carol Spensley, c/o P.T. Dept., Royal C. Johnson Mem'l Hosp., Sioux Falls
Secretary, Katharine J. Gale, 222 N. Grange, Sioux Falls

Tennessee

President, Deborah Kinsman, 3608 Brighton Rd., Nashville
Secretary, Mrs. Helen T. Nail, State Health Dept., 420 6 Ave. N., Nashville

Territory of Hawaii

President, Paula Sorg, Board of Health, Bureau of Crippled Children, Honolulu 1
Secretary, Dorothy Nagano, 103 Ala Kimo Dr., Honolulu 17

Texas

President, Martha Schmalenbeck, Gonzales Warm Springs Foundation, Gonzales
Secretary, Gladys P. Swayze, 827 Rutland, Houston 7

Utah

President, Robert G. Green, 981 S. 10 E. St., Salt Lake City
Secretary, Mrs. Johnell Yurka, 2623 Alden, Salt Lake City

Vermont

President, Margaret Corbin, Mary Fletcher Hosp., Burlington
Secretary, Veronica Cullinan, 159 S. Union St., Burlington

Virginia

President, Susanne Hirt, P.T. School, Med. College of Va., Richmond
Secretary, Sarah Jean Smith, 3107 Stonewall Ave., Richmond

Washington

President, Carolyn Bowen, 8623 41 St., S.W., Seattle 6
Secretary, Alice Goodman, 5223 41 Ave., S.W., Seattle 6

West Virginia

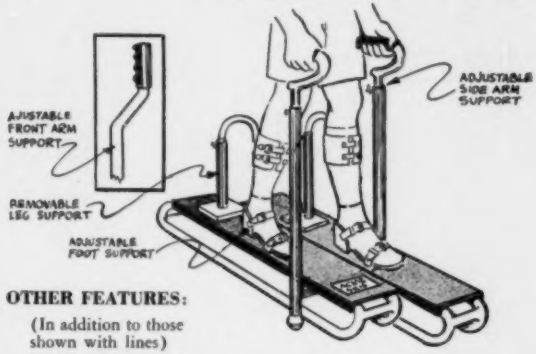
President, Mrs. Marguerite C. Rukse, Box 85, Amherstdale
Secretary, Mrs. Georgia Traub, Morris Memorial Hosp., Milton

Wisconsin

President, Norma M. Grundemann, 3617 N. 13 St., Milwaukee 6
Secretary, Alice Butler, 1013 E. Knapp St., Milwaukee 2

RECIPROCAL MOTION — ACME SKIS

FOR CHILDREN AND ADULTS



PURPOSE:

- **Walking aid**
- **Balance Training**
- **Reciprocal motion of arms and legs in walking pattern**

OTHER FEATURES:

(In addition to those shown with lines)

- **Turning is possible**
- **Turning movement is eliminated if the side stop attachment is used**
- **The length of the steps can be regulated**
- **The leg supports are adjustable. May be turned aside if not needed or removed entirely**

For Further Information Write:

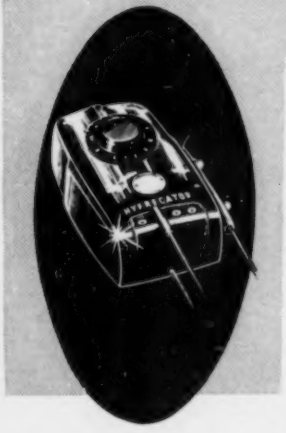
ACME SKIS

2805 S. Fairfax Ave.

Los Angeles 16, California

Pat. Pending

The BIRTCHER *Hyfrecator*



TRUTH IS SO POTENT...
WHY RESORT TO ANYTHING LESS?

Since 1939, when the Birtcher Hyfrecator was first introduced to the Medical Profession, over 70,000 doctors have purchased the device. A great number of unsolicited testimonials have been received praising its broad usefulness, its convenience and its simplicity.

Such widespread acceptance and approval make a convincing demonstration of the proven worth of the Hyfrecator in practically every type of practise. If you do not own one, now is the time to investigate how a Hyfrecator may be of value in your office. It is inexpensive; it is probably the best dollar value one can find today. Complete descriptive literature of the instrument and its uses is yours for the asking.

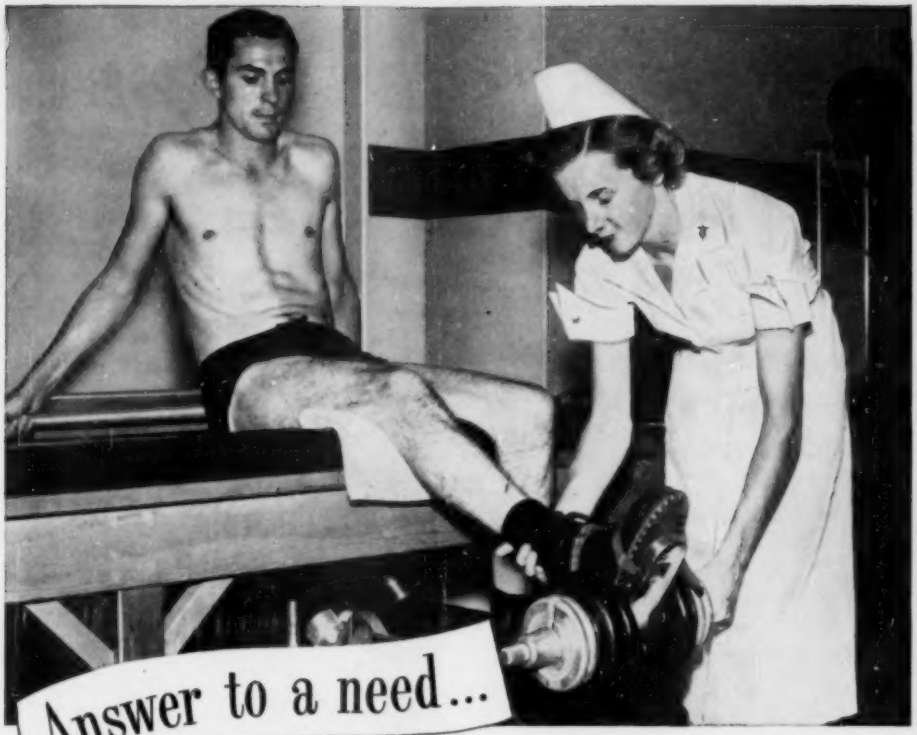
Send for free literature

THE BIRTCHER CORPORATION
5087 Huntington Drive
Los Angeles 32, Calif.

Name_____

Address_____

City_____ Zone____ State_____



Answer to a need...

Your skill as a physical therapist provides an "answer to a need" for hundreds of wound-crippled soldiers. You can help them walk again, regain the use of paralyzed muscles, find new confidence. You can give the gift of new health to these fine young men by becoming a Women's Medical Specialist Officer in the U. S. Army.

In whatever Army hospital you serve, you'll soon find yourself contributing more than you believed possible to the recovery of each of your soldier patients. Your technical knowledge and ability will increase rapidly as you gain broad new clinical experience working each day with scores of professionally challenging cases.

In addition to increased professional ability, you'll receive many material benefits as a Physical Therapist—including the pay and social prestige of a commissioned officer in the U. S. Army with all the benefits and allowances of your position.

If you are a qualified physical therapist, you may be eligible for a 2nd lieutenant's commission in the Women's Medical Specialist Corps. For full details write to The Surgeon General, U. S. Army, Washington 25, D. C.

U. S. ARMY Medical Service **WOMEN'S MEDICAL SPECIALIST CORPS**